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THE DECENNIAL PUBLICATIONS

THE SPECTRA OF STARS OF SECCHI'S FOURTH TYPE

BY

GEORGE E. HALE, FERDINAND ELLERMAN, AND J. A. PARKHURST

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THE SPECTRA OF STARS OF SECCHI'S FOURTH TYPE

George E. Hale, Ferdinand Ellerman, and J. A. Parkhurst

The possibility of basing a systematic scheme of stellar evolution on spectroscopic observations is foreshadowed in the work of Fraunhofer, who in 1823 observed for the first time the spectra of a few of the brightest stars. Though wholly ignorant of the origin of the dark lines in these spectra, Fraunhofer recognized that their number, appearance, and grouping differed greatly from star to star, and that in certain cases the solar spectrum seemed to be exactly duplicated. But it required such a general survey as that of Secchi, who examined the spectra of more than four thousand stars, to afford any basis for a scheme of classification. The purely empirical classification which he adopted includes a very large percentage of the stars among its five principal types, and subsequent systems have done little more than to add subgroups to provide for the comparatively few peculiar spectra which do not fall within Secchi's divisions.

Secchi's classification, as we have said, was a purely empirical one, intended to serve only as a convenient means of grouping similar spectra. But the researches of Huggins and Vogel soon introduced the idea of development, and the changes of spectra from type to type came to be regarded as synonymous with progressive changes in the stars themselves. Spectroscopists have agreed in regarding the white stars, with spectra characterized by the predominance of the series of hydrogen lines (Secchi's first type), as representing an early stage of development, corresponding to a condition of low density. Through the continued action of gravity, accompanied by loss of heat, the absorbing metallic vapors increase in density, producing a marked increase in the number and strength of the metallic lines, while the hydrogen lines become narrower and less conspicuous (Secchi's second type). The reduction of light caused by the greater absorption is most marked at the violet end of the spectrum, causing the color of the star to change from white to yellow. After passing this, the solar, stage, further operation of the same causes results in the production of red stars, whose spectra might be expected to indicate comparatively low temperature and high density of the absorbing vapors.

It is not clear, however, why there should be two distinct classes of red stars, characterized by widely different banded spectra. One of these classes (Secchi's third type), which includes such bright stars as *a Orionis*, *a Scorpii*, and *a Herculis*, is comparatively well known. In the pioneer days of stellar spectroscopy Huggins and Vogel measured some seventy lines in the spectrum of *a Orionis*, and the more refrangible region of the spectra of some of these stars has more recently been studied photographically by these and other observers. But much remains to be done by photographic means, particularly in the less refrangible region, where Keeler was working with marked success when interrupted by his untimely death. In the present paper our photographs of the spectra of some of these stars are reproduced for comparison with the spectra of stars of Secchi's fourth type, but the measurement of these photographs has not yet been undertaken.

As the other great class of red stars (Secchi's fourth type) includes no objects brighter than magnitude 5.3, it is obvious that the detailed investigation of their spectra is beyond the reach of telescopes of small aperture. It will be seen from the references given below that the general characteristics of these spectra were clearly recognized in the visual observations of Secchi, Dunér, Vogel, and others, but it was impossible with the instruments employed by them to observe more than the carbon bands and two or three prominent lines. Even the objective prism, as applied in conjunction with photography, has failed to show the less conspicuous details, though it has been invaluable in discovering new objects and in showing the relative intensities of the various bands in different stars. As the great light-gathering power of the forty-inch Yerkes refractor seemed to render it especially suitable for an investigation of these faint stars, the work described in this paper was undertaken in

January, 1898. In conjunction with this investigation photographs have been made of the spectra of a number of stars of other types, researches on the condition of carbon in the solar chromosphere and on the widened lines in Sun-spots have been set on foot, and considerable work on the spectrum of carbon and other substances has been done in the laboratory.

REVIEW OF PREVIOUS OBSERVATIONS

In his first classification of stellar spectra Secchi made no distinction between the two types of red stars. Indeed, a star later recognized by him as of the fourth type (*Lalande* 12,561) was classed in the memoir *Sugli spettri prismatici delle stelle fisse* (*Memoria Prima*, 1867) with *α Herculis* in the following words (*Catalogo*, p. 14): "In conclusione è tipo di *α* Ercole, ma con zone nere mancanti, onde le sue sono large tanto, che alcune ne abbracciano due di quelle di *α* Ercole." After giving measurements to show the agreement in the position of the bands with those of *α Herculis*, Secchi adds, however: "Le zone sono notabili per avere il verso della luce in senso opposto dell' ordinario."

In the second memoir (*Memoria Seconda*, 1868) it appears that the distinctive characteristics of fourth-type spectra were recognized in the course of a survey of some twenty red stars from Schjellerup's catalogue. In describing the spectrum of 152 *Schjellerup* as characteristic of the class, Secchi remarks (p. 9):

> Questo tipo è dunque composto di tre sole zone principali; una viva nel verde, una debole nel bleu e una assai viva nel rosso. Quest' ultima è spesso subdivisa in altre zone minori.
>
> Questo tipo differisce essenzialmente dal 3° non solo per la divisione della zone, le quali hanno una larghezza doppia, ma anche perchè le zone hanno la maggiore intensità luminosa in verso opposto. Cioè esse nel 4° tipo vanno crescendo di luce dal rosso verso il violetto, mentre quelle del terzo sono disposte al contrario. Talchè rappresentando il 3° tipo come un sistema di colonne, il quarto sarebbe rappresentato da cavità, supponendo la luce illuminante diretta nello stesso verso.

Few objects having spectra of the fourth type were known to Secchi, but many were discovered in the subsequent observations of Vogel, D'Arrest, Dunér, Pickering, and Espin. Pickering's first discoveries were made visually, but a very large percentage of the fourth-type stars discovered at the Harvard Observatory have been found on photographs taken with an objective prism. Qualitative observations of various fourth-type spectra, made with a small direct-vision spectroscope, are given by Friedrich Krueger in his "Catalog der farbigen Sterne."[1] McClean photographed the spectrum of 152 *Schjellerup* with an objective prism in 1896. He describes his results as follows:[2]

> Two different photographs are given of the star 152 *Schjellerup* of the 5½ magnitude. Two hours' exposure was required, which accounts for the exaggerated distortion due to the changing amount of refraction during exposure. The value of the faint details is enhanced by the correspondence of the two photographs. The presence of a line-absorption spectrum is distinctly shown, and it appears to agree to a marked extent with the usual line spectrum of Types II and III. There appears to be no trace of Dunér's Band No. 5 of Type III. The inference seems to be that spectra of Type IV arise from a natural course of change in these stars, passing directly from Type II. They are stars of Type II become less luminous, but not different in kind.

McClean also reproduces objective-prism photographs of the spectra of 19 *Piscium* and 152 *Schjellerup* in an article in the *Philosophical Transactions*, Vol. CXCI, A, p. 131, Plate XIV. His photograph of 19 *Piscium* shows only the bands, but in the two spectra of 152 *Schjellerup* some of the more conspicuous dark lines are visible. These photographs were the first to show any of the lines; unfortunately they do not seem to have been measured. A large number of fourth-type spectra have been photographed with the objective prism at the Harvard Observatory, but while the bands are well shown, the lines do not appear in these photographs. A complete list of all fourth-type stars known at that time was published in 1898 by Espin,[3] who has himself discovered many objects of this character. The classic memoir published by Dunér in 1884, "Sur les étoiles à spectres de la troisième classe,"[4]

[1] *Publicationen der Sternwarte in Kiel*, Band VIII, Kiel, 1893.

[2] *Monthly Notices*, Vol. LVII, p. 8.

[3] *Ibid.*, Vol. LVIII, p. 443.

[4] *Svenska Vetenskaps-Akademiens Handlingar*, Vol. XXI, No. 2.

Vogel's observations with the twenty-seven-inch refractor of the Vienna Observatory,[5] and McClean's photographs of 152 *Schjellerup* have afforded the best available data for the study of the spectra.

Dunér's important observations, which are frequently to be referred to in this paper, were made with several direct-vision spectroscopes of different dispersive powers attached to the ten-inch refractor of the Lund Observatory. In spite of the insufficiency of his instrumental equipment, which prevented him from seeing the dark and bright lines in the spectra of fourth-type stars, Dunér's results are of the highest value, and his conclusions are confirmed in almost every particular by our photographs. In a recent paper[6] Dunér has described his observations of bright lines in fourth-type spectra, made at the Upsala Observatory with a telescope of 36 cm. aperture. Further reference to these observations will be made below. Dunér's drawings of fourth-type spectra are reproduced from his first memoir in Plate V. His general description of fourth-type (III*b*) spectra is as follows:

Les spectres des étoiles de la classe III*b* consistent, s'ils sont parfaitement développés, en quatre zones brillantes, séparées par des bandes obscures, dégradées vers le violet, et d'une largeur extraordinaire, au moins le double de celles de la classe III*a*. La zone rouge-jaune est subdivisée par des bandes plus faibles et moins larges, dégradées soit vers le rouge, soit vers les deux côtés. La sous-zone jaune (longueur d'onde 563–589) est ordinairement la partie la plus brillante du spectre entier, et elle, ainsi que la sous-zone rouge voisine (longueur d'onde 589–621), est divisée en deux par une bande bien marquée, mais si étroite qu'elle ressemble, dans des spectroscopes d'une faible dispersion, à une raie ordinaire. En outre il y a, dans la zone verte, deux raies, ou peut-être deux bandes très étroites.

Ces caractères sont, j'en suis sûr, non moins constants, dans les spectres de cette classe, que le sont pour la classe III*a* ceux donnés ci dessus, et on les reconnaîtra indubitablement chez toutes les étoiles qui y appartiennent, à mesure qu'on pourra les examiner avec des lunettes suffisamment fortes, et à mesure que les étoiles se trouveront dans une phase de dévéloppement suffisamment avancée. Dans une lunette de 245 millimètres d'objectif comme la nôtre, il y a cependant des détails dans les spectres de la plupart de ces étoiles, qu'on ne peut apercevoir. D'abord les bandes secondaires, et les raies dans la zone verte sont plus ou moins invisibles dans les spectres des étoiles faibles, et même dans les étoiles les plus brillantes ($5^{m}.5$ seulement!) leur intensité peut être très différente. Puis l'intensité de la lumière des zones brillantes peut varier considérablement chez des étoiles de la même grandeur. Dans les étoiles d'un rouge foncé, la zone ultra-bleue est extrêmement faible en comparaison avec la même zone dans les étoiles rouge-jaune; et chez les étoiles faibles, cette zone est tout-à-fait invisible, et même la zone bleue est très difficile à voir si elles sont très rouges.

Mais aussi la bande principale à la longueur d'onde 563 est d'une opacité très variée. Chez certaines étoiles, elle est presque aussi foncée que les deux autres bandes principales; mais dans certains spectres elle est assez faible, et semble, probablement à cause de cela, être beaucoup moins large que les bandes aux longueurs d'onde 516 et 473. Celles-ci, et surtout la première d'entre elles, sont toujours très fortes et très larges, et forment le caractère le plus prononcé de ces spectres. Toutes les étoiles de cette classe sont très fortement colorées, au moins d'un rouge-jaune fort mais quelques-unes d'entre elles sont presque rouges.[7]

Dunér's measures of fourth-type (III*b*) spectra, as tabulated on p. 122 of his memoir, are given below, reduced to Rowland's scale:

WAVE-LENGTHS DETERMINED BY DUNÉR

OBJECT	19 *Piscium*	132 *Schj.*	152 *Schj.*	132 *Schj.*	152 *Schj.*	WAVE-LENGTH
Band 2	621	....	....	....	....	621
Band 3	6049	....	....	....	....	6049
Band 4 (maximum)	5896	5885	....	5896	5911	5899
Band 5	5761	5758	5748	5763	5762	5761
Band 6 (beginning)	....	5641	5625	5634	5635	5634
Band 7	551	....	....	....	....	551
Band 6 (end)	....	....	....	....	545	545
Band 8	5286	....	....	....	5281	5284
Band 9 (beginning)	....	5168	5160	5161	5165	5164
Band 9 (end)	....	....	....	....	496	496
Band 10 (beginning)	....	4715	4721	4730	4740	4728
Band 10 (end)	463	....	....	....	....	463
End of spectrum	....	....	437	....	....	437

[5] *Publicationen der Astrophysikalisches Observatorium zu Potsdam*, Vol. IV, Part I.

[6] "On the Spectra of Stars of Class III*b*," *Astrophysical Journal*, Vol. IX (1899), p. 119.

[7] *Loc. cit.*, pp. 9, 10.

In his observations at Bothkamp, and in his later work with the twenty-seven-inch Vienna refractor, Vogel measured the spectra of the stars Nos. 51, 78, 152, and 273 of Schjellerup's catalogue, and also that of *DM.* +34° 4500. Vogel's drawings of the spectra of 152 *Schjellerup* and *DM.* +34° 4500 are reproduced in Plate V. His measures (reduced to Rowland's scale) are given in the following table, which is taken from Vol. IV of the *Potsdam Publications:*

WAVE-LENGTHS DETERMINED BY VOGEL

OBJECT	152 *Schj.* (Vienna)	152 *Schj.* (Vienna)	152 *Schj.* (Bothkamp)	*DM.* +34° 4500 (Vienna)	273 *Schj.* (Bothkamp)	78 *Schj.* (Bothkamp)	51 *Schj.* (Bothkamp)	MEAN
Beginning of spectrum	....	....	660	....	....	....	....	660
Dark band	....	....	....	....	656	....	....	656
Dark band	....	....	622	....	622	623	....	622
Dark band	....	....	....	....	6066	....	....	6066
Line in a band	5892	....	5893	5890	589	590	....	5894
End of band	5849	....	....	....	....	....	....	5849
Line	5742	....	5759	5751	578	5756	....	5758
Line beginning a band	5622	5626	5629	5621	564	564	5641	5632
Line	....	....	552	....	552	....	....	552
Line	....	....	544	....	....	....	....	544
Group of lines	....	....	528	527	529	....	....	528
Line beginning a band	5160	5164	5157	5162	516	515	5166	5160
Line	5133	....	....	....	....	....	....	5133
Beginning of band	4717	....	4736	4745	472	473	....	4730
Band	....	....	437	....	....	....	....	437
End of spectrum	....	....	430	....	....	....	....	430

The combined results of the two observers, compared with Kayser and Runge's wave-lengths of the "hydrocarbon" bands, are contained in the following table:[8]

COMPARISON OF WAVE-LENGTHS

OBJECT	VOGEL	DUNÉR	MEAN	SWAN SPECTRUM
Spectrum begins	660	....	660	
Dark band	656	....	656	
Dark band	622	621	6215	
Dark band	6066	6049	6058	6060 Middle of red band
Line in a band	5894	5899	5897	
End of a band	5849	....	5849	
Line	5758	5761	5760	
Line beginning a band	5632	5634	5633	5635.43 Beginning of yellow band
Line	552	551	5515	
Line	544	545	5445	
System of lines	528	5284	5282	
Line beginning a band	5160	5164	5162	5165.30 Beginning of green band
....	....	496	496	
Line	5133	....	5133	
Beginning of a band	4730	4728	4729	4737.18 Beginning of blue band
....	....	463	463	
Band	437	437	437	4381.93 Beginning of fifth band
End of spectrum	430	....	430	

In discussing these results Scheiner, basing his conclusion on the supposition that the hydrocarbons are all reduced to acetylene (C_2H_2) at high temperatures and are characterized by a common spectrum which perhaps belongs to this substance, remarks: "We may, therefore, go a step farther and consider that in the stars of Class III*b* carbon and hydrogen are united in the form of acetylene, which is the first combination of these two elements which would ensue as the temperature fell." It will be shown later in this paper that this conclusion must in all probability be modified on account of recent advances in our knowledge of the spectra of carbon compounds.

Of the 242 stars of the fourth type catalogued by Espin there are but three in the northern hemisphere and four in the southern that are brighter than the sixth magnitude. Of the stars which

[8] FROST-SCHEINER, *Astronomical Spectroscopy*, p. 314.

have been observed photometrically Espin finds twenty-three between magnitude 6.1 and 7; thirty-nine between 7.1 and 8; seventy-six between 8.1 and 9; and eighty below 9. The red color of the stars is largely due to the extreme faintness of the blue and violet rays, and this fact greatly increases the difficulty of photographing the more refrangible region of their spectra.

INSTRUMENTS USED IN THIS RESEARCH

Most of the photographs used in the present investigation were taken with a three-prism spectrograph attached to the forty-inch refractor of the Yerkes Observatory. The form of the color-curve of the forty-inch objective has an important bearing on the relative brightness of different regions of the photographed spectra. In work on the yellow and green regions of the spectrum the slit of the spectrograph has ordinarily been set at the focus corresponding to λ 5000. The spectra of fourth-type stars generally increase in brightness from the head of the yellow carbon band toward a maximum in the green. On account of the loss of light due to the rise in the color curve and the fall in the curve of sensitiveness of ordinary isochromatic plates in the neighborhood of the *b* group, the intensity of the photographs of spectra is more nearly uniform in the green than it should be. For a similar reason the less refrangible half of the bright zone in the yellow is too faint on our photographs. These facts should be borne in mind when examining the plates which accompany this paper; it must also be remembered that the relative intensities of different regions are affected by the shading of the photographs during enlargement, which is necessary in order to bring out the lines properly. In the blue part of the spectrum, on account of the steepness of the color curve, a correcting lens near the focal plane is required. The lens not only increases the extent of spectrum photographed on a single plate, but also facilitates guiding, and thus materially reduces the exposure time.

As the spectrograph has been fully described elsewhere,[9] a very few details will suffice here. It consists essentially of a Huggins reflecting slit, with guiding eyepiece, a collimator of 31 mm. aperture and focal length of 507 mm., three 60° prisms of heavy flint glass ($n = 1.6960$), and several cameras of different focal lengths. The camera objective ordinarily employed is a photographic doublet of 37 mm. aperture and 271 mm. focal length. This gives the best results when used with a collimator objective corrected for the visual rays. For the faintest stars a camera with photographic doublet of 40 mm. aperture and about 150 mm. focal length was employed. In the earlier work one prism was frequently used with a camera of 508 mm. focal length, but it was soon found that much more satisfactory results could be obtained with three prisms and a short camera. The prisms are of a distinctly yellowish color, and undoubtedly exercise considerable absorption in the blue and violet. A spark between iron or titanium poles was used for the comparison spectrum. Unfortunately the spectrograph was not provided with a constant temperature case (Plate IV).

For the brighter stars, when it is not desired to photograph a considerable range of spectrum, slit-widths ranging from 0.01 mm. to 0.04 mm. may be used to advantage, even with an instrument having the great focal length of the forty-inch telescope. In the investigations of Messrs. Frost and Adams on stellar motions in the line of sight such widths are actually employed. But in our work on the faint red stars it was found necessary to use slit-widths as great as 0.1 mm. As the camera lens commonly preferred has a focal length whose ratio to the focal length of the collimator objective is 1: 1.9, it is evident that the breadth of the spectrum and also the width of the lines are reduced in this ratio. With a slit-width of 0.15 mm. and a dispersion of three 60° prisms, the yellow and green regions of the spectrum of 280 *Schjellerup* (mag. 7.8) required an exposure of nine hours.[10]

As recent work with the forty-inch telescope has shown that the original spectrograph is inferior in many respects to the new Bruce spectrograph, it is important that the weak points of the older

[9] GEORGE E. HALE AND FERDINAND ELLERMAN, "On the Spectra of Stars of Secchi's Fourth Type," *Astrophysical Journal*, Vol. X (1899), p. 93.

[10] This photograph has been reproduced in *Yerkes Observatory Bulletin* No. 7. With the same optical combination, and with a slit-width of 0.075 mm., the green bands in the spectrum of *a Orionis* were photographed in twenty seconds.

instrument should be pointed out, on account of their bearing on the results obtained in the present investigation. The old spectrograph was constructed by Brashear in 1893. In all respects it was almost an exact duplicate of the spectrograph designed two years previously by Keeler for the Allegheny Observatory. In most particulars it was a distinct advance upon previous instruments, especially in its embodiment of Keeler's train of three prisms, giving a deviation of about 180°, which has been adopted in almost every spectrograph constructed since that time for the determination of stellar velocities in the line of sight. It inherited from earlier instruments, however, certain defects of construction which might give no trouble in visual observations, but have made themselves felt in the long exposures required in the present investigation. The three prisms of the train, instead of being firmly clamped in a fixed position, in accordance with the practice familiar in recent instruments, were mounted on an automatic minimum deviation device. When set for any particular part of the spectrum the prisms and camera were clamped in place. It might be supposed that such clamping would eliminate all difficulties arising from the instability of the prism supports, but experience has not shown this to be the case. As at first constructed the brass plate upon which the prisms rested was very light. This was replaced by a strong ribbed plate of much heavier brass, made after Professor Wadsworth's design in our instrument shop, which undoubtedly improved the spectrograph. The prism supports were also changed for the better, and various other modifications effected in the spectrograph at this time certainly tended to increase its efficiency. It was subsequently found, however, as has been fully explained elsewhere by Professor Frost,[11] that, even when all customary precautions had been taken in his use of the instrument, the velocities of stars in the line of sight determined with its aid were sometimes subject to marked uncertainty, though some of the results were excellent. There can be no doubt, therefore, that results much more satisfactory than those here presented could have been obtained if an instrument as stable as the Bruce spectrograph had been available for the present work.

It will be seen that the circumstances were not at all favorable for the accurate measurement of radial velocities, and when the work was undertaken it was not proposed to attempt such determinations. Nevertheless, precautions were taken to avoid systematic errors, and the approximate velocities of a few of the fourth-type stars have been measured. The measurement of the plates made with the old instrument has been greatly facilitated by the use of three excellent negatives obtained with the Bruce spectrograph. Had the old spectrograph been built in such a way as to eliminate all possible effects of flexure, and provided with a constant-temperature case, good determinations of velocity could undoubtedly have been obtained for stars as faint as the eighth magnitude. The experience gained in the use of this instrument has been embodied in the Bruce spectrograph, which seems to possess none of the faults of its predecessor. At present the old spectrograph is employed with the two-foot reflector.[12] On account of the absence of chromatic aberration in the reflector, it was found possible to obtain a photograph of the spectrum of 19 *Piscium*, extending beyond the H and K lines, with an exposure (on three nights) of twenty-four and one-half hours (Plate X).

While the precision attained in the present research is greatly inferior to that of recent investigations of stellar motions in the line of sight, it is nevertheless sufficient for many purposes. As will be shown below, photographs of the spectra of a large number of fourth-type stars with moderate dispersion, and of a few selected stars with the highest feasible dispersion, are still greatly to be desired.

JOURNAL OF OBSERVATIONS

Most of the photographs were taken in the yellow-green (Y. G.) or in the blue region of the spectrum, but a few in the yellow-red (Y. R.) were secured with the aid of Erythro plates. In the earlier work, and for special purposes later, a single dense flint (D. F.) prism was employed, but the train of three dense flint prisms was generally preferred. A few photographs—including those made

11 "The Bruce Spectrograph of the Yerkes Observatory," *Astrophysical Journal*, Vol. XV (1902), p. 12.

12 G. W. RITCHEY, "The Two-Foot Reflecting Telescope of the Yerkes Observatory," *Astrophysical Journal*, Vol. XIV (1901), p. 217.

with the two-foot reflector — were taken with a single light flint (L. F.) prism, and in one case a 30° prism, silvered on the back surface, was used with the solar spectrograph. The focal lengths of the various cameras are as follows: No. 0 = 151 mm., No. 1 = 271 mm., No. 2 = 508 mm., A (Bruce spectrograph) = 449 mm.

The photographic plates which proved most satisfactory were Erythro for the yellow-red, Cramer Instantaneous Isochromatic (C. I. I.) for the yellow-green, and Cramer Crown for the blue.

Star	No.	Date	Disp.	Camera	Plate	Region	H. A. Mid.	Slit	Hour Beg.	Exp.	Comp. Spectrum			Temp.		Seeing	Remarks
											Beg.	End	Kind	Beg.	End		
		1898							h m	m	s	s		F.	F.		
132 *Schj.*	147	Jan. 28	1 D. F.	2	C. I. I.	Y. G.	....	4.0	14 15	120	3	3	*Fe* Spark	18.0	12.5	poor	
152 "	148	" 28	"	2	"	"	....	4.0	16 45	105	3	3	"	12.0	11.5	fair	
74 "	151	" 31	"	2	"	"	....	4.0	10 05	120	....	....	Moon	6.5	3.0	poor	
74 "	155	Feb. 2	"	2	"	"	....	3.0	10 58	114	....	90	"	− 4.0	− 7.5	......	
51 "	156	" 3	"	2	"	"	....	3.0	6 46	165	....	7	*Fe* Spark	13.5	13.8	......	
78 "	159	" 5	"	2	"	"	....	3.0	9 03	280	....	8	"	18.7	16.8	good	
318 *Birm.*	160	" 6	"	2	"	"	....	3.0	9 42	253	4	....	"	27.0	26.5	fair	
229 *Schj.*	161	" 6	"	2	"	"	....	4.0	15 33	175	....	7	"	27.5	28.0	"	
155 b "	164	" 13	"	2	"	"	....	5.0	15 32	85	....	2½	"	25.0	......	"	
7 "	165	" 15	"	2	"	"	....	3.0	7 20	?	2	....	"	19.7	......	poor	
155 b "	167	" 15	"	2	"	"	....	3.0	14 43	188	2	2	"	17.6	15.0	fair	
27 a "	169	" 24	"	2	"	"	....	4.0	7 00	360	....	2	"	13.6	7.0	poor	
229 "	170	" 24	"	2	"	"	....	3.0	14 25	210	....	2	"	6.5	7.0	"	
72 "	171	" 25	"	2	"	"	....	4.0	7 00	330	....	2	"	18.5	12.0	"	
41 "	175	March 3	"	2	"	"	....	3.0	7 05	420	....	3	"	28.0	18.0	fair	
132 "	177	" 16	3 D. F.	2	"	"	....	3.0	7 23	190	10	10	"	47.8	42.4	poor	
152 "	178	" 16	"	2	"	"	....	3.0	13 22	248	10	10	"	38.8	33.3	fair	
152 "	179	" 17	"	2	"	"	....	3.0	7 36	264	10	10	"	40.0	......	"	
152 "	181	" 24	"	2	"	"	....	3.0	7 28	305	13	15	"	39.0	33.5	poor	
229 "	182	" 30	1 D. F.	2	"	"	....	3.0	13 15	115	....	7	"	29.3	29.0	"	
132 "	184	April 7	"	2	Crown	Blue	....	4.0	7 00	325	2	2	"	41.5	35.7	fair	
133 "	186	" 13 " 14 " 15	3 D. F.	2	"	"	....	4	10 20 7 15 7 22	125 346 300	9 15 15	 15	" " "	44.2 52.0 54.0	42.3 44.0 52.0	poor fair good	
249 a "	193	May 13	1 D. F.	1	C. I. I.	Y. G.	....	4.0	13 33	140	....	5	"	46.0	46.5	fair	
541 *Birm.*	194	" 25	"	1	"	"	....	8.0	11 29	243	....	4	"	56.0	52.0	poor	
219 *Schj.*	195	" 26	"	1	"	"	....	7.0	11 48	115	....	....	....	60.0	......	fair	
509 *Birm.*	196	" 29	"	1	"	"	....	7.0	10 25	95	....	4	*Fe* Spark	......	49.0	poor	
458 "	197	" 30	"	1	"	"	....	6.0	10 00	140	....	....	....	56.0	......	"	
238 *Schj.*	198	" 30	"	1	"	"	....	6.0	13 00	153	....	....	....	......	......	"	
152 "	199	June 1	3 D. F.	2	"	"	....	3.0	8 52	392	20	20	*Fe* Spark	68.6	58.0	fair	
152 "	200	" 2	"	2	"	"	....	3.0	8 15	395	20	25	"	66.0	57.5	"	
521 *Birm.*	201	" 3	1 D. F.	1	"	"	....	8.0	8 55	205	....	4	"	72.0	......	"	
280 *Schj.*	202	" 3	"	1	"	"	....	8.0	12 44	250	....	4	"	68.0	......	bad	
251 "	203	" 4	"	1	"	"	....	7.0	10 55	135	....	4	"	72.0	......	good	
152 "	209	" 17	"	2	Erythro	Y. R.	....	7.0	8 47	180	95	90	"	......	......	fair	
152 "	210	" 22	"	2	"	"	....	7.0	11 20	200	120	90	"	......	......	poor	
152 "	211	July 1	"	2	"	"	....	6.0	8 30	350	90	90	"	80.0	......	good	
152 "	213	" 6	"	2	"	"	....	6.0	8 49	300	90	90	"	74.0	......	"	
152 "	214	" 8	"	2	Crown	Blue	....	4.0	8 55	280	4	5	"	71.0	68.0	poor	
249 a "	216	" 13	"	2	C. I. I.	Y. G.	....	5.0	11 10	195	5	5	"	69.0	67.0	good	
19 *Pisc.*	220	Aug. 3	"	2	"	"	....	4.0	11 52	240	....	20	"	......	61.0	fair	
7 *Schj.*	227	" 18	"	2	"	"	....	5.0	10 55	320	....	....	....	......	......	......	
19 *Pisc.*	230	" 24, 25	"	2	Erythro	Y. R.	....	6	10 35 9 20	610	120	150	*Fe* Spark	71.0	67.0	good	
D. M. 57° 702	232	" 27	"	1	C. I. I.	Y. G.	....	6.0	12 45	185	....	5	"	......	62.0	......	
280 *Schj.*	234	Sept. 7	"	1	"	"	....	3.0	7 52	505	5	5	"	57.0	55.0	fair	
19 *Pisc.*	242	" 27	Refl. Pr.	13	"	"	....	8.0	10 55	60	....	5	Moon	......	......	"	Solar Spectrograph.
19 "	244	Oct. 26	"	13	"	"	....	8.0	7 44	60	3	5	"	33.0	......	"	
280 *Schj.*	245	" 26	"	13	"	"	....	8.0	10 50	300			γ *Cass.*	......	30.2	"	
280 "	246	Oct. 31 and Nov. 1	1 D. F.	1	"	"	....	7	5 56 6 00	390		180 60 5	γ *Cass.* *Fe* Spark	47.0	43.0	"	
132 "	250	Dec. 22	3 D. F.	1	"	"	....	3.2	14 47	190	14	15	"	−1.1*	−3.0*	"	Temperature in prism box hereafter in degrees Cent.
318 *Birm.*	253	" 26	"	1	"	"	....	4.2	13 44	240	10	10	"	− 2.5	− 2.0	"	
19 *Pisc.*	257	" 28	"	1	"	"	....	4.0	5 17	266	7	7	"	− 4.3	− 1.2		
19 "	259	" 29	"	1	"	"	....	3.2	5 10	50	10	....	"	+ 5.6	......		
19 "	262	" 30	"	1	S. G. E.	Blue	....	5.0	5 12	252	3	4	"	−11.2	−16.0	"	
132 *Schj.*	263	" 30	"	1	"	"	....	5.0	13 55	240	3	3	"	−18.0	−20.6	"	
19 *Pisc.*	264	" 31	"	1	"	"	....	5.0	5 00	180	3	3	"	−16.0	−17.0	"	
		1899															
78 *Schj.*	267	Jan. 4	"	1	"	"	....	5.0	7 42	245	3	4	"	− 7.0	−11.4	"	
152 "	268	" 4	"	1	"	"	....	5.0	12 05	245	4	4	"	−11.5	−12.7	good	
19 *Pisc.*	269	" 6	"	1	C. I. I.	Y. G.	....	3.0	5 20	115	7	8	"	−10.4	−13.0	fair	
74 *Schj.*	270	" 6	"	1	"	"	....	4.0	7 50	165	7	6	"	−13.0	−13.0	"	
51 "	272	" 10, 11	"	1	"	"	....	4	8 10 6 13	187	4	6	"	− 5.6	− 4.0	good	
280 "	274	" 14	"	1	"	"	....	6.0	5 26	540	?	?	"	+ 1.0	+ 0.6	fair	
152 "	275	" 14	"	1	"	"	....	4.0	15 15	119	10	15	"	+ 0.4	− 0.3	"	
318 *Birm.*	276	" 15	"	1	S. G. E.	Blue	....	5.0	7 30	360	10	8	"	+ 1.0	+ 0.7	good	
115 *Schj.*	277	" 15	"	1	C. I. I.	Y. G.	....	4.0	14 30	160	10	7	"	+ 0.6	0.0	"	
115 "	278	" 18	"	1	"	"	....	4.0	12 40	280	12	....	"	− 7.3	− 9.0	fair	
19 *Pisc.*	283	" 20	"	1	"	"	....	4.0	5 17	30	10	10	"	+ 2.0	+ 2.0	"	
318 *Birm.*	284	" 20	"	1	"	"	....	4.0	9 48	255	8	10	"	+ 1.0	......	"	
152 *Schj.*	285	" 20	"	1	"	"	....	4.0	14 12	45	8	....	"	+ 3.0	......	poor	
124 "	286	" 23	"	1	"	"	....	5.0	11 40	230	4	4	"	− 3.0	......	"	
132 "	290	" 26	"	1	"	"	....	4.0	11 30	118	7	8	"	−14.0	−15.5	fair	
152 "	291	" 26	"	1	"	"	....	4.0	13 50	135	7	11	"	−15.5	−16.5	"	
19 *Pisc.*	293	" 27	"	1	"	"	....	4.0	5 55	125	8	6	"	−11.2	−11.5	good	
78 *Schj.*	294	Feb. 10	"	1	"	"	....	4.0	9 30	230	7	8	"	−21.0	−22.0	"	
229 "	295	" 10	"	1	"	"	....	5.0	14 35	225	12	12	"	−23.0	−23.3	fair	

Star	No.	Date	Disp.	Camera	Plate	Region	H. A. Mid.	Slit	Hour Beg.	Exp.	Comp. Spectrum Beg.	Comp. Spectrum End	Comp. Spectrum Kind	Temp. Beg.	Temp. End	Seeing	Remarks
		1899							h m	m	s	s		C.	C.		
78 *Schj.*	297	Feb. 15	3 D. F.	1	C. I. I.	Y. G.	....	5.0	9 50	242	11	16	*Fe* Spark	+ 0.2	− 3.0	fair	
229 "	298	" 23	"	1	"	"	....	5.0	13 55	245	10	15	"	−10.2	− 8.8	poor	
132 "	299	March 5	"	1	"	"	....	4.0	10 32	165	7	8	"	− 6.7	−10.0	"	
78 "	300	" 6	"	1	"	"	....	5.0	7 30	250	7	8	"	−13.1	−14.2	fair	
132 "	301	" 6	"	1	"	"	....	5.0	11 49	160	8	8	"	−14.2	−15.2	"	
152 "	302	" 6	"	1	"	"	....	5.0	16 03	110	8	8	"	−16.4	−16.4	"	
229 "	307	" 22	"	1	"	"	....	5.0	11 45	335	8	....	"	− 5.3	− 8.5	"	
132 "	309	" 23	"	1	S. G. E.	Blue	....	5.0	10 00	225	10	10	"	− 6.4	− 8.2	"	
152 "	316	" 31	"	1	"	"	....	5.0	12 15	300	7	9	"	− 5.5	− 7.0	good	
132 "	319	April 12	"	1	"	"	....	5.3	7 18	300	11	11	"	+18.0	16.2	fair	
152 *Schj.*	322	May 4	"	1	C. I. I.	Y. G.	......	10.0 5.0	9 47	30 10	....	....	....	15.0	......	good	
152 "	323	" 4	"	1	"	"	....	2.0	10 31	30	....	....	....	.....	16.0	"	
152 "	324	" 4	"	1	S. G. E.	Blue	....	6.0	11 20	300	7	8	....	14.0	11.8	fair	
152 "	326	" 10	"	1	C. I. I.	Y. G.	....	5.0	9 30	1 2 4	....	....	....	15.0	......	"	
152 "	327	" 10	"	1	"	"	....	5.0	9 40	8 16	....	....	....	....	......	good	
152 "	328	" 10	"	1	S. G. E.	Blue	....	6.0	10 23	335	7	6	*Fe* Spark	14.5	10.0	"	
155b "	329	June 7	"	1	C. I. I.	Y. G.	....	5.0	8 20	432	7	7	"	20.0	15.7	"	
249a "	332	July 5	"	1	"	"	....	4.0	9 00	350	20	19	"	20.8	17.8	"	
19 *Pisc.*	334	" 20	"	1	"	"	....	4.0	13 10	165	24	....	"	23.5	22.5	poor	
19 "	336	Aug. 24	"	1	S. G. E.	Blue	....	5.0	12 08	120	3	....	*Ti* Spark	20.0	....	fair	
19 "	337	Sept. 13	"	1	"	"	....	4.0	9 03	270	4	3	"	14.2	12.2	"	
19 "	343	Oct. 4	"	1	"	"	1°15′ E.	3.0	7 05	285	2	2	"	14.8	12.0	good	
78 *Schj.*	344	" 4	"	1	"	"	2 30 E.	4.5	12 17	310	2	2	"	12.0	10.0	"	
280 "	345	" 12	"	0	"	"	3 00 W.	5.0	10 12	180	1	....	"	18.0	...	"	
280 "	346	" 18	"	0	Crown	"	1 30 W.	5.0	10 08	200	1	....	"	8.0	...	fair	
19 *Pisc.*	355	Dec. 7	"	1	"	"	1 10 W.	4.5	4 55	325	2	2	"	3.8	2.0	"	
132 *Schj.*	356	" 18	1 L. F.	1	"	"	....	5.0	15 54	155	....	....	....	......	....	"	
19 *Pisc.*	357	" 19	3 D. F.	1	C. I. I.	Y. G.	1 10 W.	3.0	5 07	195	10	10	*Ti* Spark	− 3.0	− 3.8	good	
51 *Schj.*	358	" 19	"	1	"	"	0 30 W.	4.5	9 20	280	8	8	....	− 4.0	− 5.4	poor	
115 "	359	" 19	"	0	Crown	Blue	1 45 W.	4.5	15 00	210	1	....	*Ti* Spark	− 5.5	.....	fair	
280 "	360	" 21	"	0	"	"	3 30 W.	5.0	5 56	420	1	1	"	+ 3.8	+ 1.2	good	
115 "	361	" 21	"	0	"	"	1 20 W.	5.0	13 29	305	1	1	"	+ 1.2	− 0.8	fair	
51 "	362	" 26	"	0	"	"	....	5.2	8 33	65	....	....	"	− 9.0	......	"	
115 "	363	" 26	"	0	"	"	1 00 W.	6.0	12 25	330	....	2	"	−10.8	−13.6	"	
51 "	364	" 27	"	0	"	"	0 30 E.	5.0	7 18	310	....	1½	"	− 8.4	−10.0	"	
115 "	365	" 27	"	1	C. I. I.	Y. G.	1 45 W.	5.0	13 26	305	15	15	"	−19.5	−13.4	"	
280 *Schj.*	366	" 28	"	1	"	"	5 00 W.	6.0	5 39	555	10	15	"	−12.0	−16.2	"	
280 "	367	" 29	"	0	Crown	Blue	4 00 W.	6.0	5 10	480	1	1	"	−14.0	−18.5	"	
132 "	368	" 29	"	1	"	"	0 30 W.	5.0	13 42	315	2	2	"	−18.4	−19.0	"	
19 *Pisc.*	369	" 30	1 L. F.	1	"	"	2 30 W.	5.0	5 55	185	....	1	"	−16.0	−18.5	"	
		1900															
280 *Schj.*	370	Jan. 2	3 D. F.	1	C. I. I.	Y. G.	5 30 W.	6.0	5 07	660	10	....	"	− 5.5	− 6.2	good	
51 "	371	" 4	"	0	Crown	Blue	1 10 E.	5.0	6 30	300	....	½	"	+ 2.0	− 0.7	fair	
51 "	372	" 5	"	1	C. I. I.	Y. G.	....	5.0	7 27	300	10	9	"	+ 0.9	− 0.5	good	
74 "	373	" 7	"	1	"	"	2 20 E.	5.0	6 20	300	8	7	"	+ 3.9	+ 1.6	"	
115 "	374	" 7	"	1	"	"	2 00 W.	5.0	12 48	310	7	7	"	− 3.2	− 2.2	"	
152 "	375	" 21	"	1	Erythro	Y. R.	2 20 E.	6.0	10 43	360	300	240	"	+ 1.8	+ 1.0	fair	
51 "	377	" 24	"	1	C. I. I.	Y. G.	0 15 E.	5.0	5 35	310	7	7	"	+ 5.2	+ 4.3	"	
74 "	378	" 25	"	1	"	"	1 20 E.	5.0	6 00	320	7	7	"	−10.0	−10.8	poor	
318 *Birm.*	379	" 25	"	1	"	"	0 40 W.	5.0	12 27	280	7	7	"	−14.0	−14.3	fair	
229 *Schj.*	380	" 30	"	0	Crown	Blue	7 00 E.	5.0	13 05	305	1½	....	"	−21.3	−21.0	"	
115 "	382	" 31	"	0	"	"	1 40 W.	5.0	10 20	380	....	1	"	−20.0	−22.0	"	
74 "	383	Feb. 1	"	1	"	"	2 20 W.	5.0	8 30	370	1½	1½	"	−14.0	−14.0	good	
78 "	384	" 9	"	1	C. I. I.	Y. G.	....	5.0	10 15	260	7	13	"	−12.0	−11.8	poor	
280 "	385	" 15	"	0	Crown	Blue	5 00 W.	5.0	6 15	330	....	1½	"	−16.0	−18.5	"	
74 "	386	" 16	"	1	C. I. I.	Y. G.	2 15 W.	5.0	6 45	255	7	6	"	−17.0	−18.8	fair	
74 "	387	" 19	"	1	"	"	0 30 W.	5.0	7 00	195	6	....	"	− 7.0	− 7.4	"	
280 "	388	" 25	"	0	Crown	Blue	8 00 W.	5.0	6 20	360	1	1	"	−12.0	−16.8	good	
74 "	390	March 6	"	1	"	"	2 20 W.	5.0	6 40	390	4	2	"	− 7.0	− 9.2	"	
74 "	391	" 7	"	1	"	"	2 20 W.	5.0	6 22	380	3	2	"	− 2.3	− 4.1	"	
78 "	392	" 21	"	1	"	"	2 45 W.	5.0	6 47	315	2	2	"	− 0.5	− 0.1	fair	
318 *Birm.*	393	" 31	"	1	"	"	2 15 W.	5.0	10 35	220	2	2	"	+ 2.8	......	"	
152 *Schj.*	394	April 4	"	1	"	"	2 40 W.	4.0	11 55	300	2	2	"	+ 4.0	+ 2.9	good	
249a "	395	Aug. 8	"	1	C. I. I.	Y. G.	....	4.0	9 20	330	6	6	"	28.8	24.8	"	
249a "	396	" 19	"	1	"	"	2 40 W.	4.2	12 37	243	6	6	"	26.0	24.9	"	
249a "	397	" 28	"	1	"	"	....	3.2	12 52	135	5	6	"	19.6	18.7	"	
229 "	398	" 31	"	1	"	"	....	4.3	8 20	445	5	6	"	25.0	23.4	"	
152 "	478	1901 April 8	"	1	Erythro	Y. R.	2 40 W.	5.0	11 41	300	200	380 180	*H* Tube *Ti* Spark	......	3.0	"	
229 "	490	Oct. 24	"	A	Crown	Blue	1 00 W.	4.0	7 00	360	55 2	20 1	*Fe* Spark *Ti* Spark	11.9	11.9	fair	Bruce Spectrograph
152 "	A313	1902 Feb. 10	"	"	27 G. E.	"	2 50 E.	4.1	9 15	360	2	2½	*Ti*	− 7.4	− 7.3	good	" "
152 "	319	" 18	"	"	"	"	3 00 E.	4.0	8 25	390	2	2	"	− 6.8	− 6.9	g. to f.	" "
132 "	328	" 21	"	"	"	"	....	4.1	9 30	330	½	1½	"	− 1.2	− 1.2	good	" "
249a "	R 27	July 22	1 L. F.	1	C. I. I.	"	1 00 E.	3.0	11 00	190	....	10	"	......	......	"	24-inch Reflector
19 *Pisc.*	34	Oct. 19	"	1	27 N. H.	"	....	4.0	6 50	330	30	15	Moon	......	......	fair	" "
19 "	35	" 24	"	0	"	"	....	4.0	6 50	70	....	½	Sky	......	......	"	" "
19 "	37	" 30	"	0	"	"	....	4.0	5 55	465	....	½	"	......	......	good	" "
19 "	38	Nov. 18 to 23	"	0	"	"	....	5.0	6 ±	1480	....	½	"	......	......	fair	" "

Seed's Gilt Edge (S. G. E.) plates were also used in some cases. The slit-width is expressed in divisions of the head: one division = 0.025 mm. A spark between iron poles was usually employed for the comparison spectrum, part of the exposure being given before, part after, the exposure for the star. A titanium spark was used in the later work. The temperature in the prism box was recorded at the beginning and at the end of the exposure. Most of the exposures were made by Mr. Ellerman.

APPEARANCE OF THE SPECTRA ON THE PHOTOGRAPHS

The spectra were photographed in four sections, as follows:

1. λ 3930 to λ 4380. These photographs were taken on Seed 27 non-halation plates with a single light flint prism and a camera of 151 mm. focal length, used in conjunction with the two-foot reflector. They were made for the special purpose of showing the very faint region in the extreme violet part of the spectrum, and some of them are therefore overexposed in the blue.

2. λ 4380 to λ 4980. Most of these photographs were taken with three dense flint prisms and a camera of 271 mm. focal length. Cramer Crown plates were usually employed. With the aid of the correcting lens, the color curve of the forty-inch objective, which is very steep in this region, was flattened out sufficiently to give fairly uniform illumination through the middle part of the spectrum. At both ends, however, the brightness falls off somewhat on account of the change in focus. In the less refrangible region these spectra are further weakened by the fact that the plates are relatively insensitive for light of these wave-lengths. It will be seen from these and other facts that the region of the spectrum lying between λ 4900 and λ 5160 is not well represented on most of our photographs.

3. λ 5160 to λ 5800. The greater part of these photographs were taken with three dense flint prisms and a camera of 271 mm. focal length on Cramer isochromatic plates. As already remarked on p. 7, the form of the color curve of the forty-inch objective and the fall in sensitiveness of the plates in this region cause these photographs to be relatively underexposed at the more refrangible end, though the focus was set for λ 5000. Little is shown beyond λ 5800, as the isochromatic plates decrease rapidly in sensitiveness in this region.

4. λ 5630 to λ 6600. Photographs of the spectra of 152 *Schjellerup* and 19 *Piscium* were obtained in this region with a single dense flint prism and a camera of 508 mm. focal length on Erythro plates.

In studying the photographs, it is necessary to bear in mind the fact that the various adjustments required in photographing the spectra in sections necessarily introduce differences of relative intensity, and render it almost impossible to determine accurately the distribution of brightness throughout the spectra. In the following description of the photographs it is to be understood, therefore, that the appearances described relate to the plates themselves, and not to the spectra as seen visually in a telescope.

General characteristics.— The most striking features of spectra of the fourth type are the dark bands attributed to the compounds of carbon. The principal bands have their less refrangible edges at λ 4737.8, λ 5167.9, and λ 5636.9. Bright zones, consisting of bright lines and strong continuous spectrum, appear on our plates on the less refrangible side of the first and last of these heads;[13] and bright and dark lines are found in connection with the continuous spectrum throughout the region photographed. The fluted character of the carbon bands is strikingly evident in the region λ 5500–λ 5637, especially in such stars as 132 *Schjellerup;* it also appears in the other carbon bands when the exposures are suitable, and in the cyanogen band at λ 4502–λ 4606 (see Plate VII).

Details.— The violet region of the spectra of fourth-type stars is so faint that it can be photographed only with the greatest difficulty. On account of the form of the color curve and the absorption in the violet of the forty-inch objective, no attempt was made to include the extreme violet on plates taken with the large refractor. It was nevertheless deemed of great importance to determine whether the H and K lines and the $H\gamma$ and $H\delta$ lines were present, and also to render possible the comparison of fourth-type with third-type spectra in the violet region. For this reason a few photographs of the spectra of 19 *Piscium* were made, as described above, with the two-foot reflector. The most prominent features of these photographs are the very strong calcium line at λ 4227 and the H

[13] The brightness of the region on the less refrangible side of the carbon head at λ 5167.9 is reduced on our photographs for the reasons given above.

and K bands, which are very conspicuous. Less prominent, but nevertheless unmistakable, are the dark hydrogen lines $H\gamma$ and $H\delta$, as well as the G group and two conspicuous lines at λ 4058 and λ 4384 (Figs. 1 and 2, Plate X).

The presence of dark $H\gamma$ and $H\delta$ lines renders the existence of a bright $H\beta$ line in the photographs taken with three prisms a matter of great interest. The comparatively large scale of these spectra and their sharpness of definition leave no doubt as to the presence and identification of lines in this region. In two or three stars $H\beta$ appears as a bright line, and in this character it is the most striking feature of the spectrum of 280 *Schjellerup*. In several of the stars, however, $H\beta$ is altogether absent, and in no case do we find it present as a dark line. The bearing of these results on the physical condition of hydrogen in the fourth-type stars is discussed elsewhere (p. 126).

The cyanogen flutings, with heads at λλ 4608.9, 4578.4, 4553.3, 4515, and 4503.2, are characteristic features of all the fourth-type spectra we have examined, including 280 *Schjellerup*. In each fluting the continuous spectrum grows stronger toward the blue, but the bright lines in this region are scattered with less regularity than in the yellow flutings. From the more refrangible edge of the bright blue zone at λ 4738.6 the continuous spectrum, here of maximum brightness, gradually decreases in intensity toward λ 5000. Between this zone and the head of the dark carbon band at λ 4737.8 there are two unidentified flutings in the spectrum of 152 *Schjellerup*, but in most of the other stars only one of these flutings appears. The most prominent dark lines are those at λλ 4408, 4435, 4497, 4506, 4523, and 4535. Between λ 5000 and λ 5169 the carbon absorption is nearly complete, and for various other reasons already given few details are shown in our photographs of this region. Nevertheless, the carbon heads at λ 5099 and λ 5129 can be recognized in 229 *Schjellerup* (Fig. 1, Plate VII).

In the green and yellow the continuous spectrum decreases in intensity from the maximum near the *b* group and attains its minimum brightness in the absorption of the yellow carbon bands. These flutings have heads at λλ 5638.8, 5587.7, and 5505.5, and form the most characteristic feature of the spectrum. Each is made up of bright and dark lines, the bright lines being strongest at the more refrangible part of each fluting, while the dark lines are broadest and strongest at the less refrangible edge. For various reasons, discussed elsewhere, this effect, in some cases, at least, appears to be due to the presence of genuine bright lines, and not merely to contrast. Other bright lines, the character of which cannot be doubted, occur in the green region, where they are very conspicuous on the original negatives. The bright yellow zone also contains a large number of bright lines, lying on a less brilliant background of continuous spectrum. In 280 *Schjellerup* the bright lines are inconspicuous. The broad dark line λ 5620–5638 is double, and the component λ 5620–5626 contains three vanadium lines. In 280 *Schjellerup* this double line is the only well-marked trace of the yellow carbon band. In 19 *Piscium* the entire set of flutings is easily recognized, and they increase in intensity as we pass to 318 *Birmingham*, 74, 78, and 132 *Schjellerup*, while in 152 *Schjellerup* they are less noticeable, apparently from increased carbon absorption, which cuts down the contrast. The most conspicuous dark lines in this part of the spectrum have the wave-lengths λλ 5226, 5329, 5350, 5371, 5397, 5410, and 5447. The last pair of lines has a curious appearance, resembling that of a symmetrical reversal. The *b* lines are conspicuous in all of the stars. In the more fully developed stars the group λ 5204–5211 becomes the most prominent feature in this part of the spectrum. The *b* group also becomes stronger, but b_3 and b_4 are nearly lost in the carbon absorption band whose head is at λ 5169.1.

The more refrangible part of the spectrum is shown in a few photographs obtained with Erythro plates. The D line appears strong and dark, but it is not divided, as the plates were taken with one prism. The continuous spectrum is fairly strong from the sodium line to a dark line at λ 5732, which separates this part from the bright yellow zone, λ 5637–5726. In the region λ 6086–6340 the bright lines and strong continuous spectrum form a bright zone. There are two unmistakable bright lines at λ 6176 and λ 6201, and also two which are less certainly bright at λ 6108 and λ 6131. There

is a strong bright line at λ 6270, and two or three probably bright lines in the interval λ 6275–6340. There is also a dark line at λ 6358. At λ 6445 there is possibly a bright line. From this point the continuous spectrum greatly decreases in intensity until its limit is reached at λ 6600 (Fig. 1, Plate VI).

Certain peculiarities in the spectrum of 152 *Schjellerup* are referred to on p. 131.

THE PRESENCE OF BRIGHT LINES

In his memoir *Sugli Spettri Prismatici delle Stelle Fisse*, and in his treatise *Le Soleil*, Secchi refers in several places to the existence of bright lines in the spectra of fourth-type stars:

> Non mancano in queste stelle (152 *Schjellerup*) delle righe brillanti come le metalliche, ed è singolare che esse si mostrano nella estremità più viva delle zone colorate. Gli spettri di queste stelle hanno più che gli altri analogia coi gas, e specialmente con quello del carbonio, ma rovesciato.[14]
>
> Avvertimmo già che in alcune vi sono delle righe vive assai simili alle metalliche, le quali spiccano assai; alcune nel giallo paiono fili d'oro.[15]

Such references would seem to leave no doubt that Secchi saw some of the bright lines whose existence is shown by our photographs. His intensity curve of the spectrum of 78 *Schjellerup* (Fig. 1)[16] places two of the bright lines in the yellow not far from their true positions, though the less refrangible of these two lines should be given much greater intensity than the more refrangible one. But the illustration of the spectrum of the same star published later by Secchi in the second edition of *Le Soleil* (Plate M) contains no bright lines, while the drawing of the spectrum of 152 *Schjellerup* in the same plate shows two narrow bright lines in each of the three bright zones, but omits the strong bright lines in the yellow carbon band. Moreover, in describing the spectrum of 132 *Schjellerup*, Secchi remarks:

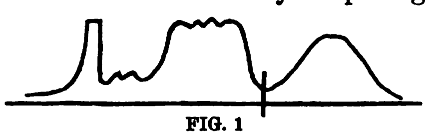

FIG. 1

> Tipo 4° ben deciso con due forti righe lucide nel giallo assai vive e che sono da misurare se fosse il sodio.

Other intensity curves given by Secchi show, as Dunér has pointed out in his memoir,[17] that in some cases the supposed bright lines probably refer to the broad yellow sub-zone, the width of which is not less than ninety tenth-meters. Thus in describing the spectrum of 136 *Schjellerup*, whose intensity curve is reproduced in Fig. 2 from the *Memoria Seconda*, p. 44, Secchi remarks:

FIG. 2

> Lo spettro è analogo alla 132, ma in parte diverso: ha una forte riga doppia viva nel giallo, poi segue una zona scura.

As Dunér states:

> Secchi s'est plus tard persuadé, par des mesures, que les deux raies jaunes n'ont pas la même position que celles du sodium, mais il est néanmoins difficile de comprendre comment il a pu croire que cette zone, quarante fois plus large que la distance entre D_1 et D_2, fût les raies du sodium.

On the whole, it is hardly probable that Secchi actually distinguished the true bright lines, though he was so much impressed by the appearance of the bright zones that he remarked:[18]

> Le spectre dans son ensemble se présente comme un spectre direct appartenant à un corps gazeux, plutôt que comme un spectre d'absorption.

In this connection it is an interesting fact that Pickering in his early visual surveys of stellar spectra states that a normal fourth-type spectrum "consists of a well-defined yellow band, a broad green band well defined on the more refrangible side and generally less sharply bounded on the other, and a blue band in some cases well defined toward the violet."[19]

[14] *Memoria Seconda*, p. 9.

[15] *Ibid.*, p. 12.

[16] Reproduced from his *Memoria Seconda*, p. 40; the red end of the spectrum is at the left.

[17] *Loc. cit.*, p. 10.

[18] *Le Soleil* (2d ed.), Vol. II, p. 458.

[19] *A. N.* 2376.

Dunér quotes Secchi's statements regarding bright lines in his memoir,[17] but states that he has never seen the least thing which could explain Secchi's belief in bright lines, and remarks that Vogel was not more fortunate. At that time he also considered that the spectrum was incontestably an absorption spectrum, and Vogel entertained the same view:

Es stellt sich unzweifelhaft heraus, dass die Discontinuität des Spectrums nur eine scheinbare ist, hervorgebracht durch breite Absorptionsbanden.[20]

More recently, Dunér has observed the spectra of these stars with a telescope having a Steinheil visual objective of 36 cm. aperture, and remarks: "Of first importance is the fact that I was able to detect without difficulty bright lines in various spectra which at Lund were either invisible or at least could not be discovered."[21] The detailed observations given in this paper show that a bright line (probably the one at λ 5592) was seen by Dunér in the spectra of all of the brighter stars.

Our earliest photographs of the spectra of fourth-type stars, made before the publication of Dunér's second paper, seemed to show without question the presence of bright lines. But as Dunér had expressed so decided an opinion against their existence, and as his conclusions had been supported by the results of Vogel's observations, it seemed desirable to undertake a series of tests for the purpose of meeting any doubts that might arise.

As shown on the photographs, the numerous bright lines in these spectra appear decidedly stronger than the continuous spectrum in their neighborhood, and prove their superior brightness by extending out on either side of the general spectrum, thus showing their power of impressing the plate at points where the continuous spectrum was too faint to do so. The evidence thus afforded as to the genuineness of the bright lines is not preserved in the widened photographs of the plates, but is fairly well shown in a direct enlargement of the spectrum of 132 *Schjellerup* reproduced in Plate V.

The following tests were employed to determine the genuineness of the bright lines:

1. It was found that an exposure of four minutes was sufficient to photograph the bright line at λ 5592 in the spectrum of 152 *Schjellerup* with a dispersion of three prisms, while equal density of the contiguous spectrum could not be obtained under the same conditions with an exposure of less than from twelve to fifteen minutes. If the line is supposed to be due to the continuous spectrum, it must be assumed that the heavy carbon absorption band is interrupted at this point. It is true that the line falls close against the second head of the fluting, and therefore at a point where the absorption band would be weakest. But the bright line appears to be sharply bounded on both sides, whereas it should fade away gradually toward the red if it were due to decreased absorption.

2. By increasing the dispersion an apparent bright line, if really due to continuous spectrum bounded by portions of the carbon absorption band, should be rendered less conspicuous. In our experiments it was found, however, that the contrast between the bright lines and the contiguous spectrum increased rather than diminished with the dispersion, and that the lines were best observed both visually and photographically with our most powerful combination of three heavy flint prisms.

3. Similarly, an increase in slit-width should tend to reduce the contrast if the effect were due to continuous spectrum bounded by dark lines or bands. In practice, however, the bright lines were admirably shown with the widest slits, and increase of slit-width did not seem to reduce the contrast.

Although there can be no doubt as to the presence of iron and other metals in these stars, it will be seen from inspection of the detailed comparisons on pp. 117–22 that many of the strong lines of these substances are absent. A large part of these can be accounted for, however, if it is assumed that they are hidden by overlying bright lines.

Photographic observations alone were not allowed to settle the matter, and on many occasions the spectra of 132 *Schjellerup* and 152 *Schjellerup* were examined visually with the three-prism spectroscope attached to the forty-inch telescope. With an observing telescope having a focal length of 253 mm. and an eyepiece magnifying thirteen diameters, the bright line at λ 5592 was easily seen,

[20] *A. N.* 2000.

[21] "On the Spectra of Stars of Class IIIb," *Astrophysical Journal*, Vol. IX (1899), p. 121.

as well as a number of other bright lines in the red, yellow, green, and blue. Under the same circumstances some of the more conspicuous dark lines were seen without much difficulty, but the less conspicuous ones were not visible.

As a further precaution, we requested Professors Keeler and Campbell to observe the spectrum of 152 *Schjellerup* with the thirty-six-inch refractor of the Lick Observatory. They did so, using a dispersion of three prisms, and Professor Keeler reported his observations as follows:

I compared the spectrum with Vogel's drawing in *Potsdam Publications*, Vol. IV. The drawing seemed to be merely a rough indication of what the spectrum actually is. What we saw was much more like your photograph. It is curious that Vogel did not see the bright line λ 550 $\pm$, as it is a conspicuous feature of the spectrum with the thirty-six-inch. The bright block λ 553 $-$ λ 584 seems to be a complex of bright and dark lines or bands, and the dark band as shown in the drawing (λ 573) is relatively too conspicuous. Vogel's dark band at λ 525 is made up of lines, of which there are many in the neighborhood. There is a strong line at or near D. We tried to identify it with the *Na* line in a spirit lamp, but the telescope was jumping in a high wind, and the comparison did not amount to much. There were many dark lines in the red.

To my mind, there is little doubt that the spectrum of this star contains bright lines.

These results are in striking contrast with those obtained by Sir Norman Lockyer, and reported by him in his article, "The Piscian Stars":[22]

The Kensington observations were made chiefly during 1894 and 1895, with special reference to the lines involved. The stars selected for observation were 132 *Schjellerup*, 152 *Schjellerup*, 115 *Schjellerup*, and 19 *Piscium*. The 3-foot reflector was used. In addition to the carbon bands, numerous lines were seen without much difficulty, but only the more prominent ones could be satisfactorily measured. Among the lines recorded in 132 *Schjellerup* were $H\beta$, the E line of iron at 5269, and a group of lines near λ 5380. In 115 *Schjellerup* additional lines were measured near 5005, 5762, and 5429, and the presence of $H\beta$ was again determined by comparison with a hydrogen vacuum tube. In 19 *Piscium* numerous lines were observed, among them being D and F. No suspicion of bright lines was entertained during these observations. Attempts to photograph the spectra were not sufficiently successful to help matters.

A three-foot reflector should be admirably adapted for the investigation of these stars, whether visually or photographically. And yet the bright lines, which should have been easily visible, were not seen, while $H\beta$ was recorded as a dark line in 132 *Schjellerup*, 115 *Schjellerup*, and 19 *Piscium*. As a matter of fact our photographs show no dark $H\beta$ line in any of these stars.

In discussing the probability of the existence of bright lines on our photographs, Lockyer was at a disadvantage, as he had not seen the original negatives, and the few published reproductions did not adequately represent the facts. As Fig. 3, Plate V, shows, the bright lines are distributed all through the spectrum, and are by no means confined to the edges of flutings, where Lockyer thinks contrast effects would sufficiently account for the appearance of the photographs.[23]

In the table of mean wave-lengths (p. 92), which contains 213 bright lines, we have included only those lines which were regarded as unquestionably bright by at least two independent observers. In some cases, where the brightness of the line is but very little greater than that of the continuous spectrum, there might easily be some room for doubt, and many lines of this character have accordingly been excluded from the table. In many other cases, on the contrary, the bright lines are so much stronger than the continuous spectrum that the most critical observer of the original negatives would not hesitate for a moment to distinguish them from mere spaces between dark lines. We may add that the judgment of a large number of spectroscopists who have examined the negatives coincides entirely with our own.

MEASUREMENT OF THE PHOTOGRAPHS

As it seemed more important, in the existing state of the subject, to examine thoroughly a small number of photographs than to study a large number of spectra less completely, the following plates were selected for detailed measurement:

[22] *Proc. Roy. Soc.*, Vol. LXVI, p. 137.

[23] The bright lines are unduly conspicuous in Fig. 2, Plate VI, as the contrast of the plate was increased in copying.

LIST OF PLATES MEASURED

Star	Plate	Date			G. M. T.	Exp.	Hour-angle	Qual.	Comp. Spec.	
									Kind	Qual.
		y	m	d	h	m				
19 *Piscium*..........	G 259	1898	12	29	11.6	50	W 0.6	C	*Fe*	B
	G 264	1898	12	31	12.5	180	W 1.6	C-B	*Fe*	C
	G 269	1899	1	6	12.3	115	W 1.9	A	*Fe*	C
	G 293	1899	1	27	13.0	125	W 3.9	A-B	*Fe*	B
	G 343	1899	10	4	15.5	285	E 1.3	B	*Ti*	A
	G 357	1899	12	19	12.8	195	W 1.2	A	*Ti*	A
	R 34	1902	10	19	15.6	330	E 0.3		Moon	
	R 37	1902	10	30	15.8	465	W 0.7		Sky	
	R 38	1902	11	18, 19, 22, 23	15±	1480	0 ±		Sky	
280 *Schjellerup*	G 346	1899	10	18	16.1	200	W 1.5	C	*Ti*	B
	G 366	1899	12	28	11.6	565	W 5 ±	B-C	*Ti*	B
	G 367	1899	12	29	11.2	480	W 4 ±	C	*Ti*	B
	G 370	1900	1	2	11.1	660	W 5.5	C	*Ti*	B
318 *Birmingham*	G 253	1898	12	26	21.7	240	E 0.5	B	*Fe*	B
	G 276	1899	1	15	16.4	360	E 4.4	B	*Fe*	B-C
	G 284	1899	1	20	17.8	255	E 2.7	B	*Fe*	B-C
	G 379	1900	1	25	20.7	280	W 0.4	C-B	*Ti*	B
	G 393	1900	3	31	18	220	W 2.2	A	*Ti*	B
74 *Schjellerup*	G 373	1900	1	7	15.0	300	E 2.1	A-B	*Ti*	B
	G 383	1900	2	1	17.3	370	W 1.8	C	*Ti*	C
	G 386	1900	2	16	14.8	255	W 0.3	C-D	*Ti*	B
	G 391	1900	3	7	15.5	380	W 2.3	B	*Ti*	B
78 *Schjellerup*	G 300	1899	3	6	14.8	250	W 2.0	B	*Fe*	B
	G 344	1899	10	4	20	310	E 2.8	B	*Ti*	A
	G 384	1900	2	9	18.4	260	W 2.9	B	*Ti*	B
	G 392	1900	3	21	18	315	E 2.9	A	*Ti*	B
132 *Schjellerup*	G 299	1899	3	5	17.8	165	W 0.3	B	*Fe*	B-C
	G 301	1899	3	6	19.0	160	W 1.5	A	*Fe*	A
	G 309	1899	3	23	17.8	225	W 1.4	B-C	*Fe*	B-C
	G 368	1899	12	29	22.1	315	W 0.2	C-B	*Ti*	C-B
	A 328	1902	2	21	18.3	330	E 0.7	A	*Ti*	A-B
115 *Schjellerup*	G 363	1899	12	26	21.0	330	W 1.0	C-D	*Ti*	C
	G 365	1899	12	27	21.8	305	W 1.8	B	*Ti*	C
	G 374	1900	1	7	20.5	310	W 2.3	B	*Ti*	B
	G 382	1900	1	31	19.3	380	W 1.7	B-C	*Ti*	B-C
152 *Schjellerup*	G 275	1899	1	14	22.2	119	E 0.8	A	*Fe*	B
	G 291	1899	1	26	20.8	135	E 1.3	B	*Fe*	
	G 302	1899	3	6	22.8	110	W 3.3	A	*Fe*	A-B
	G 316	1899	3	31	20.7	300	W 2.7	B	*Fe*	B
	G 394	1900	4	4	17.3	300	E 2.7	A	*Ti*	B
	A 313	1902	2	10	18.3	360	E 2.8	B	*Ti*	B
	A 319	1902	2	18	17.7	390	E 3.0	A	*Ti*	A-B
	G 211	1898	7	1	17.4	350	W 5.5		*Fe*	

The other photographs, which include many excellent spectra, were used for general study and comparison.

The scale of the spectra is given in the following table:

SCALE OF THE PLATES

I. PLATES TAKEN WITH THREE PRISMS

(Camera 1)

Blue Region		Yellow-Green Region		
Wave-Length	$\frac{ds}{d\lambda}$	Wave-Length	$\frac{ds}{d\lambda}$	
t.m.	mm.	t.m.	mm.	
4400	0.054	5200	0.025	End of spectrum
4700	0.036	5500	0.019	Middle of spectrum
5000	0.026	5800	0.015	End of spectrum

SCALE OF THE PLATES—*Continued*

II. PLATES TAKEN WITH ONE PRISM

Blue Region (Camera 0)		Red Region (Camera 2)		
Wave-Length	$\frac{ds}{d\lambda}$	Wave-Length	$\frac{ds}{d\lambda}$	
4000	0.010	5800	0.011	End of spectrum.
4200	0.008	6200	0.009	Middle of spectrum
4400	0.006	6600	0.007	End of spectrum

The three prisms of the old spectrograph have a visual resolving power of about 33,000 for λ 4860, but with the slit-widths employed in the present investigation only a small fraction of this is realized. In the region near λ 4400 it is possible to separate on the photograph lines 0.8 tenth-meter apart, while at λ 5600 lines 1.3 tenth-meters apart are resolved.

With the Bruce spectrograph (camera A), which was used in a few cases, the scale is:

Wave-Length	$\frac{ds}{d\lambda}$
4400	0.084
4700	0.036
5000	0.026

Method of measurement.—Four different machines were used in the measurements: the Zeiss comparator, described in our earlier paper;[24] two similar machines, Nos. 122 and 873; and the Gaertner measuring machine, described by Messrs. Frost and Adams.[25] Careful investigations have shown that the scale errors of the Zeiss comparators and the errors of the screw of the measuring machine are of the same order, not exceeding 2 μ or 3 μ. With narrow slits and spectra better defined than those here available such errors would enter appreciably. We have found it sufficient, however, to eliminate the errors as far as possible by measuring the plates at four different parts of the screw or scale and adopting the mean as the true position of the line. No difference in treatment is required for the measurements of the different machines, as the same methods were used in all cases to eliminate errors. All of the measures given in this paper (excepting those of G 211, by Mr. Ellerman) were made by Mr. Parkhurst.

The plates were adjusted on the sliding stage of the machine so that the length of the spectrum was parallel to the scale (or screw), and the cross-hair in the microscope eyepiece was made parallel to the spectral lines. Four settings were made on standard lines of the comparison spectrum, two on the lines above the star spectrum, followed by two on the lines below. For the first few plates four settings were made on the star lines, but this number was afterward reduced to three. The average number of standard lines measured on each plate was thirteen. In order to test the stability of the plate on the machine these standards were generally measured both before and after the settings were made on the star lines. A single cross-hair, running entirely across the field of the microscope, was used throughout the measures. Each plate was measured in two positions on the machine, red end toward the right and left, respectively, and the mean of the results was used.

REDUCTION OF THE MEASURES

We have described in a previous article[26] the various methods of reduction tried before we finally adopted the plan described in the present paper. These involved graphical methods, in which an interpolating machine devised for the purpose was employed, and a least-squares method based upon the use of the valuable Cornu-Hartmann interpolation formula. The results obtained by the least-squares method were entirely satisfactory, but considerable time was required to compute the

[24] GEORGE E. HALE AND FERDINAND ELLERMAN, "On the Spectra of Stars of Secchi's Fourth Type. I," *Astrophysical Journal*, Vol. X (1899), p. 102.

[25] EDWIN B. FROST AND WALTER S. ADAMS, "Radial Velocities of Twenty Stars having Spectra of the Orion Type," *Publications of the Yerkes Observatory*, Vol. II, p. 148.

[26] GEORGE E. HALE AND FERDINAND ELLERMAN, *loc. cit.*, p. 103.

constants of the formula in this way. For this reason the least-squares solution was replaced by a residual-curve method, which furnished an equally satisfactory means of correcting the approximate constants and required far less time. This method is described in the present paper.

The combination of red-right and red-left measures was effected by subtracting the mean of the red-left measures from a constant so chosen as to make the difference about equal to the mean of the red-right measures. The final mean of this difference and the mean of the red-right measures was taken as the quantity s in the Cornu-Hartmann formula

$$\lambda = \lambda_0 + \frac{c}{s - s_0} ,$$

in which s is the mean scale reading, λ_0, c, and s constants derived by substituting the scale readings of three standard lines for s and solving the three resulting equations, and λ is the desired wave-length. The derivation of the constants and the solution of the equation for the wave-length of each star line was greatly facilitated by the use of the Brunsviga calculating machine.

Reduction to the Sun.—The correction for the Earth's orbital velocity was made by the use of formulæ given by Dr. Schlesinger,[27] where we may put:

$$\text{Tan } \lambda = [9.96255] \tan \alpha + [9.59987] \sec \alpha \tan \delta$$
$$b = [1.47371] \sec \lambda \cos \alpha \cos \delta$$
$$c = [8.224]\, b \sin (281^\circ\ 20' - \lambda).$$

For 1900 we obtain the following constants for reduction to the Sun:

Star	R. A.	Dec.	Long.	Log b	c
74 *Schjellerup*	6h 19m 46s	+14° 46'.6	94° 50'	1.4689	−0 06
78 *Schjellerup*	6 29 40	+38 31.6	96 04	1.4539	−0.04
115 *Schjellerup*	8 49 45	+17 36.7	130 03	1.4734	+0.24
132 *Schjellerup*	10 32 36	−12 51.9	164 53	1.4456	+0.42
318 *Birmingham*	10 38 08	+67 56.2	125 44	1.2538	+0.01
152 *Schjellerup*	12 40 26	+45 59.2	165 34	1.3227	+0.32
19 *Piscium*	23 41 17	+ 2 56.0	356 42	1.4733	−0.50
280 *Schjellerup*	23 56 10	+59 47.9	33 45	1.2555	−0.28

The correction to the wave-length of the star lines was then

$$\Delta\lambda = V_a \left(\frac{\lambda}{299860}\right) .$$

Instead of applying this correction separately to each wave-length derived from the formula, it was combined in the following manner with the correction curve which is required when the formula is used in its approximate form, without the exponent of the denominator $(s - s_0)$:

Correction curve.—An average of thirteen standard lines were measured in the comparison spectrum on each plate. With the exception of the three lines used in deriving the constants of the formula, each line gave a correction required to reduce its wave-length given by the formula to the standard wave-length. These corrections were platted on squared paper, as shown in Fig. 3, in which the abscissæ are wave-lengths given by the formula (scale, one square equals 10 t.m.) and the ordinates are the corrections (scale, one square equals 0.01 t.m.). A smooth curve, shown by the dotted line, was drawn through these points, from which corrections could be read off for each star line. The correction required for reduction to the Sun was then laid off on the same scale as the correction curve. This is a straight line located by the values for two arbitrarily chosen wave-lengths, λ 4400 and 5000. The final correction curve, shown by the full line, was then drawn, making its ordinates the algebraic sum of the ordinates of the first curve and the reduction to the Sun. From this curve corrections were taken out and applied to the wave-length given by the formula for each star line. The correction for diurnal motion of the observer amounted to 0.005 t.m. only in the case of one plate, G 293 for 19

[27] *Astrophysical Journal*, Vol. X (1899), p. 2.

Piscium, and as only two decimals were considered in the reductions, the diurnal correction was neglected for the other plates.

Combination of results.—The negatives taken on ordinary plates covered the region λ 4370–4980; those taken on isochromatic plates, λ 5170–5850. For convenience these will be called the blue and yellow-green regions, respectively. At least two plates of a region were measured for each star,

CORRECTION CURVE

78 *Schjellerup*, Plate G 392

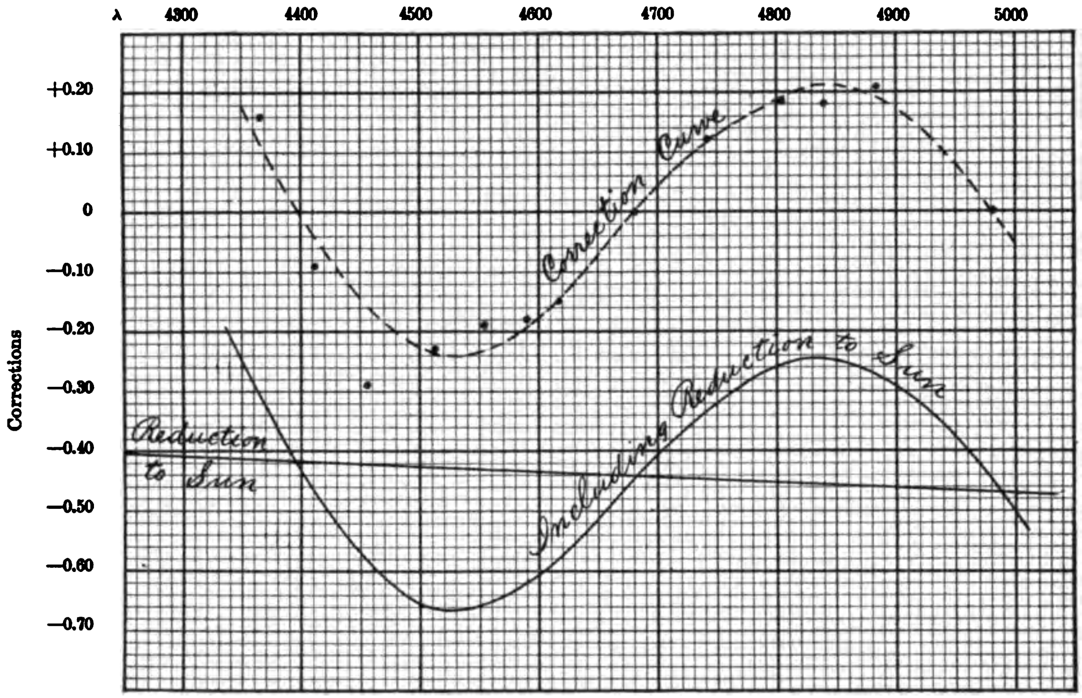

FIG. 3

and more than two if the quality of the plates required. In the case of lines measured on both plates, the mean of the results was taken as the wave-length of the line in that star, but for lines measured on only one plate the wave-length was reduced to the system of the two plates by adding to it the mean difference between the wave-lengths of the lines common to both. In the case of stars for which three or more plates were measured, the uncorrected means of the measures were taken. We thus have the following table of corrections to wave-lengths of lines found on only one plate:

CORRECTIONS TO WAVE-LENGTHS OF LINES FOUND ON ONLY ONE PLATE

Star	Region	Corrections	Basis
19 *Piscium*	blue	Mean = 264 − 0.06 = 343 + 0.06	76 lines
280 *Schjellerup*	blue	Mean = 346 + 0.09 = 367 − 0.08	24 lines
	yellow-green	Mean = 366 + 0.23 = 370 − 0.23	39 lines
318 *Birmingham*	blue	Mean = 276 + 0.03 = 393 − 0.03	57 lines
74 *Schjellerup*	blue	Used only one plate, G 391	
	yellow-green	Mean = 373 − 0.20 = 386 + 0.20	44 lines
78 *Schjellerup*	blue	Mean = 344 + 0.20 = 392 − 0.20	74 lines
	yellow-green	Mean = 300 + 0.06 = 384 − 0.06	63 lines
132 *Schjellerup*	yellow	Mean = 301 + 0.10 = 299 − 0.10	62 lines
115 *Schjellerup*	blue	Mean = 368 − 0.02 = 382 + 0.02	16 lines
	yellow-green	Mean = 365 + 0.02 = 374 − 0.01	64 lines
152 *Schjellerup*	yellow-green	Mean = 302 + 0.06 = 275 − 0.06	90 lines

Exceptions to the adopted methods.—The reductions for the six plates of 19 *Piscium* were carried out separately for the measures "red right" and "red left," and the means taken of the resulting wave-lengths, after which the correction for radial velocity was applied. To apply the correction curve to fit the formula to the wave-lengths of the standard lines, somewhat different methods were used for the first eight plates measured, six of 19 *Piscium*, and plate G 275 of the yellow-green region of 152 *Schjellerup*. On account of the poor quality of the standard lines and the effect of a neighboring air-line on the wave-length of the iron standard at λ5710.75, the true form of the correction curve for the spectrograph was masked. The frequent appearance of an air-line close to the line mentioned shifted the center from one to two tenth-meters capriciously. After this was recognized this line was no longer used in deducing the constants of the formula. To avoid re-reduction, after the true form of the correction curve was found, a second curve was drawn, and from it were taken the quantities needed to apply to the results from the first curve.

The methods used for the first seven plates can be briefly described as follows:

19 *Piscium*

G 269. Red right and left reduced separately; Cornu-Hartmann correction curve assumed as zero; reduction to Sun applied.

G 293. Red right and left reduced separately; Cornu-Hartmann curve taken as a straight line (first constants). Applied to the observed scale reading of the three standard lines, the correction from the residual curve with sign reversed, and expressed in scale divisions. Second constants, which will include the corrections from the curve, computed with these corrected scale readings. Reduction to Sun then applied.

G 259. Red left. Same as G 293.
Red right. Measured February 26 and March 1, 1901; shift found and two sets of measures reduced separately.
Reductions same as before, except that the reduction to Sun was combined with the correction from the Cornu-Hartmann (straight-line) curve.

G 357. Same as last. Same correction curve for measures right and left.

G 264. Same as last.

G 343. Shift found between measures of March 11 and 12, 1901, two parts reduced separately; otherwise same as last.

152 *Schjellerup*

G 275. Red right and left combined before reduction, otherwise same as last.

CONSTANTS OF THE PLATES

The following tables contain the constants of the plates, including the wave-lengths and mean scale readings of the standard lines, the residuals corresponding to the approximate and corrected formula, the approximate and corrected values of the constants of the formula, and the reduction to the Sun. Kayser and Runge's wave-lengths were used for the standard iron lines, and those of Hasselberg for the standard titanium lines.

On account of the special methods of reduction employed, 19 *Piscium* is given first. The stars follow in the order described on p. 19. The order in the tables of constants and in the tables of detailed measures is therefore as follows:

19 *Piscium*.
280 *Schjellerup*.
318 *Birmingham*.
74 *Schjellerup*.
78 *Schjellerup*.
132 *Schjellerup*.
115 *Schjellerup*.
152 *Schjellerup*.

PLATE G 264. 19 *PISCIUM*

Blue Region

Wave-Length *Fe*	Red Right: Mean Scale Reading	Red Right: Δ_1	Red Right: Δ_2	Red Left: Mean Scale Reading	Red Left: Δ_1	Red Left: Δ_2
t.m.	mm.			mm.		
4404.93	*48.0031*	−01	00	*37.6904*	00	+01
4447.89	45.9732	+66	+72	39.7267	+56	+62
4494.74	43.8423	+19	+28*	41.8478	+18	+27
4508.38	43.2639	+43	+52	42.4344	+40	+49
4528.79	42.3876	+07	+14	43.3057	+16	+23
4549.64	41.5323	+06	+12	44.1603	+18	+24
4584.02	*40.1697*	−01	+01	*45.5275*	00	+02
4661.67	37.3202	+23	+18	48.3760	+28	+23
4705.54	35.8217	+19	+11	49.8773	+16	+08
4788.37	33.2006	+19	+13	52.4998	+11	+05
4871.90	30.7980	+22	+25	54.8975	+28	+31
4924.12	29.4009	+10	+19	56.2962	+08	+17
4957.65	*28.5432*	−01	+10	*57.1527*	00	+11
1st Constants S_0	−19.4311			105.0359		
1st Constants c	91886.800			−91580.450		
1st Constants λ_0	3042.33			3045.07		
2d Constants S_0	−19.4291			105.0339		
2d Constants c	91875.058			−91568.385		
2d Constants λ_0	3042.13			3044.89		

Reduction to Sun: λ4400 −0.43 t.m.; λ5000 −0.49 t.m.

PLATE G 343. 19 *PISCIUM*

Blue Region

Wave-Length *Ti*	Red Right, For λ4395 to 4639: Mean Scale Reading	Δ_1	Δ_2	Red Right, For λ4640 to 4940: Mean Scale Reading	Δ_1	Δ_2	Red Left, For λ4395 to 4744: Mean Scale Reading	Δ_1	Δ_2	Red Left, For λ4746 to 4979: Mean Scale Reading	Δ_1	Δ_2
t.m.	mm.			mm.			mm.			mm.		
4387.01	50.4255	+32	+09	50.4198	+21	+09	37.9330	+14	−04	37.9418	−02	−04
4427.27	48.3368	+36	+18	48.3302	+23	+18	40.0252	+12	+01	40.0317	00	−05
4468.66	*46.2929*	+03	−07	*46.2903*	−03	−07	*42.0599*	00	00	*42.0681*	−18	−02
4481.44	45.6950	+13	+06	45.6905	+03	+06	42.6623	+01	+04	42.6711	−18	00
4512.91	44.2482	−01	−02	44.2457	−07	−02	44.1087	−12	−03	44.1165	−28	−02
4555.66	42.3886	+03	+06	42.3837	−08	+06	45.9699	−10	+02	45.9768	−27	−05
4590.12	40.9548	−14	−09	40.9510	−23	−09	47.4009	−20	−09	47.4084	−41	−06
4639.77	39.0119	+01	+04	39.0094	−06	+04	49.3436	−04	+02	49.3540	−32	00
4682.09	*37.4430*	+01	00	*37.4420*	−01	00	*50.9117*	−01	00	*50.9199*	−24	−14
4742.98	35.3230	+08	−03	35.3191	−03	−03	53.0382	−12	−20	53.0426	−25	−01
4805.44	33.3006	+22	+04	33.2981	+14	+04	55.0519	+28	+15	55.0590	+05	−12
4856.20	31.7540	+18	−02	31.7519	+11	−02	56.6023	+12	00	56.6093	−12	−04
4900.09	30.4842	+15	−03	30.4804	+02	−03	57.8747	00	−06	57.8807	−22	−08
4981.91	*28.2675*	+04	00	*28.2652*	−05	00	*60.0881*	−01	+06	*60.0944*	−25	−01
1st Constants S_0	−22.5504			−22.5504			110.8605			110.8605		
1st Constants c	99611.386			996113.86			−99448.140			−99448.140		
1st Constants λ_0	3021.70			3021.70			3023.21			3023.21		
2d Constants S_0	−22.5504			−22.5731			110.8586			110.8520		
2d Constants c	99611.386			99682.675			−99473.010			−99440.955		
2d Constants λ_0	3021.70			3021.00			3022.63			3022.78		

Reduction to Sun: λ4400 −0.12 t.m.; λ5000 −0.13 t.m.

PLATE G 259. 19 *PISCIUM*

Yellow-Green Region

WAVE-LENGTH *Fe*	RED RIGHT λ 5329 to 5730: Mean Scale Reading	Δ_1	Δ_2	RED RIGHT λ 5170 to 5327: Mean Scale Reading	Δ_1	Δ_2	RED LEFT: Mean Scale Reading	Δ_1	Δ_2
t.m.									
5169.19	....	....	....	....	....	....	47.2448	+60	....
5227.30	*41.0882*	00	00	*41.0816*	00	00	*48.6097*	00	00
5233.12	40.9560	−04	−10	40.9496	−03	−10	48.7458	−21	−10
5269.72	40.1457	−07	00	40.1409	+01	00	49.5553	−20	00
5328.24	38.9050	−09	−01	38.8967	−17	−01	50.7950	−15	−01
5371.70	*38.0262*	00	00	*38.0198*	00	00	*51.6730*	00	00
5447.13	36.5805	+36	00	36.5734	+32	00	53.1236	+15	00
5495.88	35.6819	−06	−06	35.6761	−03	−06	54.0168	+07	−06
5586.99	34.1037	−39	−06	34.0973	−39	−06	55.5918	+05	−06
5615.80	33.6317	−27	+06	33.6260	−23	+06	56.0654	+12	+06
5710.75	*32.1467*	00	+27	*32.1404*	00	+27	*57.5588*	00	+27
1st Constants S_0	−7.9827			−7.9983			97.8653		
c	106470.150			106517.970			−107251.499		
λ_0	3057.58			3057.00			3049.85		
2d Constants S_0	−7.9806			−8.0029			97.8716		
c	106462.010			106543.200			−107326.399		
λ_0	3057.04			3056.08			3048.48		

Reduction to Sun: λ 5200 −0.51
λ 5800 −0.57

PLATE G 269. 19 *PISCIUM* PLATE G 293. 19 *PISCIUM* PLATE G 357. 19 *PISCIUM*

Yellow-Green Region

WAVE-LENGTH *Fe*	G 269 RED RIGHT: Mean Scale Reading	Δ_1	Δ_2	G 269 RED LEFT: Mean Scale Reading	Δ_1	Δ_2	G 293 RED RIGHT: Mean Scale Reading	Δ_1	Δ_2	G 293 RED LEFT: Mean Scale Reading	Δ_1	Δ_2
t.m.	mm.			mm.			mm.			mm.		
5227.30	*43.9940*	00	−10	*41.7002*	00	−10	*42.9954*	00	+01	*45.1292*	00	−01
5233.12	43.8554	+09	+08	41.8357	+20	+08	42.8547	−01	−11	45.2760	−27	−11
5269.72	42.9853	00	+10	42.7044	+07	+10	41.9897	+07	+04	46.1398	−18	−04
5328.24	41.6500	−28	−07	44.0376	−23	−07	40.6623	+09	+05	47.4674	−23	−05
5371.70	*40.7129*	00	+04	*44.9744*	00	+04	*39.7178*	00	00	*48.4047*	00	00
5447.13	39.1652	+37	00	46.5299	−07	00	38.1677	+22	−01	49.9612	−10	−01
5495.88	38.2040	−03	−17	47.4859	−19	−17	37.2116	+09	....	50.9120	+05	+05
5586.99	36.5215	−03	+06	49.1694	−15	+06	35.5195	−40	−13	52.6015	−23	−13
5615.80	36.0086	−38	−07	49.6773	−16	−07	35.0155	−22	+06	53.1090	−21	−06
5710.75	*34.4283*	00	+35	*51.2707*	00	+35	*33.4254*	00	+35	*54.7013*	00	+35
1st Constants S_0	−8.1361			94.5758			−9.4841			97.9301		
c	112070.841			−115677.489			113758.306			−115281.415		
λ_0	3077.47			3039.76			3059.63			3043.98		
2d Constants S_0							−9.4820			97.9375		
c							113766.597			−115334.071		
λ_0							3059.34			3043.15		

Plate G 269 — Reduction to Sun (t.m.): λ 5200 −0.49; λ 5800 −0.55

Plate G 293 — (t.m.): λ 5200 −0.40; λ 5800 −0.45

WAVE-LENGTH *Ti*	G 357 RED RIGHT: Mean Scale Reading	Δ_1	Δ_2	G 357 RED LEFT: Mean Scale Reading	Δ_1	Δ_2
t.m.	mm.			mm.		
5173.92	36.4756	−01	+04	48.0762	00	+04
5210.55	*35.5891*	00	00	*48.9622*	+01	00
5283.63	33.9151	+23	00	50.6387	+21	00
5336.97	32.7521	+04	−04	51.7984	+20	−04
5381.20	31.8350	+21	00	52.7175	+29	00
5418.98	31.0741	+14	+02	53.4797	+16	+02
5481.65	*29.8637*	−01	−03	*54.6903*	00	−02
5565.70	28.3422	+21	−03	56.2132	+12	−03
5644.36	*27.0004*	−01	+02	*57.5528*	00	+02
5739.69	25.4805	−20	−10	59.0691	−01	+09
1st Constants S_0	−15.8800			100.2952		
c	111464.870			−110799.850		
λ_0	3044.93			3052.09		
2d Constants S_0	−15.8947			100.3095		
c	111510.045			−110842.820		
λ_0	3044.24			3051.34		

Reduction to Sun (t.m.): λ 5200 −0.52; λ 5800 −0.58

280 *SCHJELLERUP*

Blue Region

Plate G 346				Plate G 367			
Mean Scale Reading	Wave-Length *Ti*	Δ_1	Δ_2	Mean Scale Reading	Wave-Length *Ti*	Δ_1	Δ_2
mm.	t.m.			mm.	t.m.		
49.3729	4443.7	+60	+60	*63.2423*	*4399.92*	00	00
49.8135	*4457.59*	00	−02	62.3717	4427.28	−03	+06
51.4204	4512.88	−02	+05	61.4266	4457.59	−53	−35
51.5627	4518.18	+18	+25	60.7309	4481.41	−32	−10
52.5929	4555.64	−33	−20	59.8395	4512.88	−25	00
53.4724	4590.11	+20	+34	59.6911	4518.18	−31	−06
54.1599	4617.41	−28	−16	59.5639	4522.97	−14	+11
55.0952	4656.60	−06	−01	58.6853	4555.64	−20	+04
55.6826	*4682.08*	00	+05	57.7949	4590.11	−36	−16
57.3454	4758.30	+36	−05	57.1238	4617.41	−22	−06
58.2813	4805.56	+52	+25	56.1976	4656.60	−08	−01
58.9789	4841.00	−15	−41	*55.6183*	*4682.08*	00	00
61.4564	*4981.91*	00	+03	54.2993	4742.94	−01	−12
....	....	....	....	53.5457	4780.18	+43	+27
....	....	....	....	52.0805	4856.18	+19	+01
....	....	....	....	*49.9083*	*4981.91*	00	00

	Plate G 346	Plate G 367
S_0	94.0103	18.0710
c	−64792.977	62770.074
λ_0	2991.58	3010.32

		t.m.	t.m.
Reduction to Sun:	λ 4400	+0.03	−0.24
	λ 5000	+0.04	−0.28

280 *SCHJELLERUP*

Yellow-Green Region

Plate G 366				Plate G 370			
Mean Scale Reading	Wave-Length *Ti*	Δ_1	Δ_2	Mean Scale Reading	Wave-Length *Ti*	Δ_1	Δ_2
mm.	t.m.			mm.	t.m.		
40.9966	*5173.92*	00	+06	*48.8976*	*5173.92*	00	00
41.8908	5210.49	−25	−07	49.371	5193.14	+02	+18
43.8858	5297.21	−46	−29	49.7986	5210.49	−34	−11
44.7375	5336.96	+02	+07	50.1572	5226.70	+82	+109
45.6630	*5381.20*	00	−07	*52.6575*	*5336.97*	00	+02
45.9835	5396.71	−21	−30	53.5845	5381.20	+09	−04
46.2404	5409.81	+12	00	54.3470	5418.98	+27	+06
46.4255	5418.98	+02	−11	57.1059	5565.70	+11	−02
47.7924	5490.36	+43	+25	*58.4564*	*5644.36*	00	00
49.1699	5565.70	+05	−06	....	....	....	....
50.5148	*5644.36*	00	+02	....	....	....	....

	Plate G 366	Plate G 370
S_0	93.5694	101.4441
c	−111874.379	−111170.513
λ_0	3045.93	3058.26

		t.m.	t.m.
Reduction to Sun:	λ 5200	−0.28	−0.29
	λ 5800	−0.32	−0.33

318 *BIRMINGHAM*

Blue Region

PLATE G 276				PLATE G 393			
Mean Scale Reading	Wave-Length *Fe*	Δ_1	Δ_2	Mean Scale Reading	Wave-Length *Ti*	Δ_1	Δ_2
mm.	t.m.			mm.	t.m.		
64.4229	4383.72	+08	+02	*53.2009*	*4338.05*	00	+03
63.2501	*4404.93*	00	00	54.9209	4367.81	−19	−02
62.6931	4415.29	+01	+03	56.6851	4399.92	−26	−01
59.5733	4476.19	−13	00	58.1195	4427.27	−24	+06
58.6767	4494.74	−15	00	59.6501	4457.59	−31	+02
57.0916	4528.80	−12	00	62.5149	4518.20	−29	−02
56.1596	4549.64	−06	00	64.1621	4555.66	−07	+07
54.6749	*4584.02*	00	−02	*65.6139*	*4590.12*	00	+03
51.5566	4661.67	+19	−02	66.7210	4617.41	−01	−05
49.9257	4705.13	−07	−27	69.1905	4682.09	+20	00
47.0665	4788.14	+28	+05	71.8860	4758.87	+36	+02
44.4345	4871.87	+26	+10	73.4022	4805.44	+60	+23
43.8522	4891.37	+13	00	74.5215	4841.00	+34	00
41.9707	*4957.67*	00	−03	75.8467	4885.25	+27	00
....	....	....	....	*78.5343*	*4981.91*	00	00

	Plate G 276	Plate G 393
S_0	10.1483	129.8943
c	99367.483	−100110.616
λ_0	3051.12	3032.72

Reduction to Sun:	Plate G 276 (t.m.)	Plate G 393 (t.m.)
λ 4400	+0.05	−0.24
λ 5000	+0.05	−0.27

318 *BIRMINGHAM*

Yellow-Green Region

PLATE G 253				PLATE G 284				PLATE G 379			
Mean Scale Reading	Wave-Length *Fe*	Δ_1	Δ_2	Mean Scale Reading	Wave-Length *Fe*	Δ_1	Δ_2	Mean Scale Reading	Wave-Length *Ti*	Δ_1	Δ_2
mm.	t.m.			mm.	t.m.			mm.	t.m.		
57.2442	5169.16	+76	+67	55.0796	5169.16	+32	+13	*52.1792*	*5336.97*	00	00
58.6969	*5227.30*	00	00	*56.5509*	*5227.30*	00	−09	53.1100	5381.20	+14	+14
59.6921	5269.72	00	−08	57.5747	5269.72	−22	−06	53.8872	5418.98	−20	−20
61.0101	5328.24	−17	−05	58.9138	5328.24	−27	−11	*55.2737*	*5490.36*	00	00
61.9368	*5371.70*	00	−08	*59.8623*	*5371.70*	00	00	56.6576	5565.70	−05	−05
63.4698	5447.13	+04	−01	61.4332	5447.13	+18	−05	57.2398	5598. ±	....	....
66.0718	5586.99	−05	−09	64.0932	5586.99	+06	−09	*58.0153*	*5644.36*	00	00
66.5719	*5615.80*	00	−01	*64.6062*	*5615.80*	00	−01	....	....	....	....
68.1374	5710.75	+26	−33	66.2106	5710.75	+11	−13	....	....	....	....

	Plate G 253	Plate G 284	Plate G 379
S_0	98.4298	−8.8018	101.8269
c	−109164.979	111732.492	−114566.029
λ_0	3093.30	3087.52	3029.39

Reduction to Sun:	Plate G 253 (t.m.)	Plate G 284 (t.m.)	Plate G 379 (t.m.)
λ 5200	+0.16	+0.03	0.00
λ 5800	+0.17	+0.03	0.00

74 *SCHJELLERUP*

Blue Region

PLATE G 383				PLATE G 391			
Mean Scale Reading	Wave-Length *Ti*	Δ_1	Δ_2	Mean Scale Reading	Wave-Length *Ti*	Δ_1	Δ_2
mm.	t.m.			mm.	t.m.		
59.7101	*4367.81*	00	−12	*63.7228*	*4338.05*	00	+02
58.6411	4387.01	−05	−11	62.0096	4367.81	−10	−03
56.5137	4427.27	+15	+15	60.9454	4387.01	−13	−04
54.9766	4457.59	00	+04	58.8166	4427.27	−13	−02
53.4843	4488.98	+32	+38	57.2945	4457.59	−06	+02
52.1098	4518.20	−02	+03	55.8020	4488.98	−36	+43
50.4506	4555.66	−11	−10	54.6765	4512.88	−03	+01
49.0041	*4590.12*	00	−04	52.7859	4555.66	+05	+04
47.9038	4617.41	+09	00	*51.3311*	*4590.12*	00	−08
45.4380	4682.09	+15	+02	50.2342	4617.41	+13	+01
42.7401	4758.87	−22	−22	49.3627	4639.81	+35	+19
41.2337	*4805.44*	00	−10	47.7783	4682.09	+57	+35
39.6574	4856.20	−53	−37	45.0631	4758.91	+50	+24
36.1047	4981.91	−24	00	43.5719	4805.44	+77	+51
....	....	....	....	41.9998	4856.20	+54	+32
....	....	....	....	*38.4530*	*4981.91*	00	−06
S_0	−14.0069				−12.5623		
c	96452.828				99163.762		
λ_0	3059.39				3038.14		
		t.m.			t.m.		
Reduction to Sun :	λ 4400	−0.27			−0.41		
	λ 5000	−0.30			−0.47		

74 *SCHJELLERUP*

Yellow-Green Region

PLATE G 373				PLATE G 386			
Mean Scale Reading	Wave-Length *Ti*	Δ_1	Δ_2	Mean Scale Reading	Wave-Length *Ti*	Δ_1	Δ_2
mm.	t.m.			mm.	t.m.		
49.4201	*5173.92*	00	+05	46.2325	5129.32	+23	−23
48.9478	5193.15	−04	+03	*45.1015*	*5173.92*	00	−07
48.5252	5210.55	−17	−09	44.2076	5210.55	−18	−06
46.8421	5283.63	+15	+25	42.5254	5283.63	+06	+20
45.6696	5336.96	−16	−06	41.3588	5336.96	−06	+05
44.7454	5381.20	−06	+02	40.4318	5381.20	−14	−06
43.9827	*5418.98*	00	+05	*39.6717*	*5418.98*	00	+05
42.7605	5481.64	−38	−36	38.4555	5481.64	−14	−12
41.2329	5565.70	−56	−55	38.0363	5504.10	−10	−08
40.6544	5598.52	....	....	36.9235	5565.70	−07	−05
39.8877	*5644.36*	00	+03	*35.5795*	*5644.37*	00	+04
38.3625	5739.69	+12	+21	34.5041	5710.75	−10	−03
S_0	−3.2991				−7641.6		
c	112342.502				112652.526		
λ_0	3042.96				3038.56		
		t.m.			t.m.		
Reduction to Sun :	λ 5200	−0.11			−0.41		
	λ 5800	−0.13			−0.46		

78 *SCHJELLERUP*

Blue Region

Plate G 344				Plate G 392			
Mean Scale Reading	Wave-Length *Ti*	Δ_1	Δ_2	Mean Scale Reading	Wave-Length *Ti*	Δ_1	Δ_2
mm.	t.m.			mm.	t.m.		
63.1672	*4367.81*	00	+05	54.8138	4367.81	+16	+06
62.1143	4387.00	−16	−05	*53.7495*	*4387.00*	00	−02
60.8363	4411.24	−18	−01	52.4548	4411.24	−09	−04
58.5141	4457.59	−22	00	50.0992	4457.59	−29	−12
55.9369	4512.88	−22	+02	47.4950	4512.88	−23	+01
54.0798	4555.64	−04	+10	45.6095	4555.64	−19	+04
52.6517	4590.11	−03	+02	44.1637	4590.11	−18	+01
51.5655	*4617.41*	00	−04	43.0637	4617.41	−15	00
49.1406	4682.08	+19	−03	*40.6050*	*4682.09*	00	00
47.0254	4742.94	+36	+02	38.4597	4742.94	+12	00
43.9084	4841.00	+35	+01	36.4094	4805.44	+28	+09
42.1884	4900.10	+34	+09	35.3002	4841.00	+18	−04
39.9713	*4981.91*	00	−03	33.9833	4885.25	+21	+02
....	....	....	....	*31.3066*	*4981.91*	00	00
S_0	−10.3146				−20.1282		
c	97825.631				100724.798		
λ_0	3036.52				3023.61		
		λ	t.m.		t.m.		
Reduction to Sun:		λ 4400	−0.41		−0.42		
		λ 5000	−0.47		−0.47		

78 *SCHJELLERUP*

Yellow-Green Region

Plate G 300				Plate G 384			
Mean Scale Reading	Wave-Length *Fe*	Δ_1	Δ_2	Mean Scale Reading	Wave-Length *Ti*	Δ_1	Δ_2
mm.	t.m.			mm.	t.m.		
48.6220	5169.16	+80	+80	48.7537	5129.32	−01	−01
47.1559	*5227.30*	00	+08	*47.6129*	*5173.92*	00	+08
47.0039	5233.12	−48	−22	46.7019	5210.55	−37	−24
46.1419	5269.72	−38	00	43.8175	5336.96	−15	−08
44.8091	5328.24	−46	−01	*42.8835*	*5381.20*	00	+02
43.8752	*5371.70*	00	+26	42.1128	5418.98	+10	+07
42.3283	5447.13	+56	+41	40.4598	5504.10	+12	+04
39.6709	5586.99	+01	−25	39.3302	5565.70	−05	−15
39.1611	*5615.87*	00	−24	37.9753	5644.37	+31	+22
37.5737	5710.75	+91	+78	36.4263	5739.69	−11	−17
....	....	....	....	*34.2046*	*5890.19*	00	+04
....	....	....	....	34.1190	5896.16	−16	−09
S_0	−6.1511				−5.4517		
c	117379.147				112414.141		
λ_0	3025.37				3055.48		
		λ	t.m.		t.m.		
Reduction to Sun:		λ 5200	−0.47		−0.35		
		λ 5800	−0.52		−0.39		

132 *SCHJELLERUP*
Blue Region

A 328				G 309				G 368			
Mean Scale Reading	Wave-Length *Ti*	Δ_1	Δ_2	Mean Scale Reading	Wave-Length *Fe*	Δ_1	Δ_2	Mean Scale Reading	Wave-Length *Ti*	Δ_1	Δ_2
mm.	t.m.			mm.	t.m.			mm.	t.m.		
31.5024	4395.17	−02	−03	*62.4163*	*4404.93*	00	00	*56.7597*	*4387.01*	00	+03
31.9008	*4399.92*	00	+01	60.2114	4447.89	−48	+63	54.6542	4427.27	−14	+03
34.1584	4427.28	−07	+01	59.2437	4466.73	−17	+03	53.1443	4457.59	−29	−03
35.4942	4443.97	−13	−01	57.8957	4494.74	−22	+03	52.0070	4481.44	−27	+03
35.9139	4449.32	−12	+01	57.2672	4508.38	−05	+21	50.5589	4512.88	−32	00
36.5603	4457.59	−17	−03	56.3247	4528.79	−30	−03	48.6922	4555.66	−27	+02
38.3718	4481.41	−17	+01	55.4063	4549.64	−15	+10	47.2555	4590.11	−37	−14
39.8503	4501.43	−10	00	53.9336	4584.02	−18	+02	45.3119	4639.83	−03	+05
40.6756	4512.88	−17	+02	*50.8472*	*4661.67*	00	00	*43.7368*	*4682.09*	00	00
41.7110	4527.48	−15	+03	49.2341	4705.54	+22	+06	41.6096	4742.98	+15	00
42.9227	4544.83	−24	−08	46.3933	4788.37	+21	−04	39.5773	4805.44	+28	−01
43.449	4552.62	−15	00	43.7829	4871.90	+01	−13	38.0231	4856.20	+24	−01
43.6524	4555.64	−13	+01	43.2143	4891.67	+47	+37	36.7454	4900.09	+12	+03
44.2083	4563.94	−08	+05	42.2717	4924.12	00	−04	*34.5165*	*4981.91*	00	−03
45.9286	4590.11	−01	+06	*41.3449*	*4957.65*	00	+03	....	....	....	....
47.6681	4617.41	−03	−03	....	....	....	....	....	....	....	....
48.0299	*4623.24*	00	−02	....	....	....	....	....	....	....	....
48.4157	4629.47	00	−05	....	....	....	....	....	....	....	....
50.0564	4656.60	+07	−05	....	....	....	....	....	....	....	....
50.7129	4667.76	+14	−01	....	....	....	....	....	....	....	....
51.5433	4682.08	+23	+05	....	....	....	....	....	....	....	....
52.5096	4698.94	+21	00	....	....	....	....	....	....	....	....
54.9363	4742.94	+25	−02	....	....	....	....	....	....	....	....
55.8169	4759.44	+23	−06	....	....	....	....	....	....	....	....
59.9223	4841.00	+36	+07	....	....	....	....	....	....	....	....
62.0044	4885.25	+32	+08	....	....	....	....	....	....	....	....
66.2345	*4981.91*	00	00	....	....	....	....	....	....	....	....
67.5660	5014.40	−16	−04	....	....	....	....	....	....	....	....
S_0	147.4070				−10.8653				−16.6050		
c	−158930.815				100360.323				100308.460		
λ_0	3023.97				3035.41				3019.75		
	t.m.				t.m.				t.m.		
Reduction to Sun: λ 4400	+0.09				−0.12				−0.38		
λ 5000	+0.11				−0.14				−0.43		

132 *SCHJELLERUP*
Yellow-Green Region

WAVE-LENGTH *Fe*	PLATE G 299			PLATE G 301		
	Mean Scale Reading	Δ_1	Δ_2	Mean Scale Reading	Δ_1	Δ_2
t.m.	mm.			mm.		
5169.19	....	....	....	47.1218	+12	−03
5227.30	*45.0723*	00	+04	*45.6560*	00	+07
5233.12	44.9302	−10	−04	45.5089	−26	−16
5269.72	44.0654	−28	−09	44.6418	−23	−03
5328.24	42.7445	−29	00	43.3136	−14	00
5371.70	*41.8117*	00	+32	*42.3719*	00	+04
5447.13	40.2555	−23	+07	40.8215	+42	+38
5586.99	37.6158	−28	−16	38.1675	+03	+01
5615.80	*37.1108*	00	+06	*37.6577*	00	+01
5710.75	35.5259	+94	+70	36.0667	+61	+72
S_0	−8.9628			−7.3702		
c	121504.394			115975.198		
λ_0	2978.68			3040.17		
	t.m.			t.m.		
Red. λ 5200	0.00			−0.01		
to Sun: λ 5800	0.00			−0.01		

115 *SCHJELLERUP*

Blue Region

Plate G 363				Plate G 382			
Mean Scale Reading	Wave-Length *Ti*	Δ_1	Δ_2	Mean Scale Reading	Wave-Length *Ti*	Δ_1	Δ_2
mm.	t.m.			mm.	t.m.		
51.2059	*4457.59*	00	−06	*55.9916*	*4387.00*	00	+04
49.3290	4522.97	+01	+05	54.8351	4421.92	−26	−10
48.4488	4555.64	−05	+01	53.7213	4457.59	−29	−07
47.5625	4590.11	+01	+07	52.1040	4512.88	−12	+09
46.8846	4617.41	−05	−01	51.9529	4518.18	−19	+01
45.3711	*4682.08*	00	−04	51.8199	4522.97	−16	+03
44.9979	4698.94	+13	+06	50.9310	4555.64	+14	+24
44.0499	4742.94	+07	−07	50.0328	4590.11	−09	−12
43.7169	4759.07	+18	+01	*49.3511*	*4617.41*	00	−16
43.2898	4779.98	+10	−09	47.830	4682.08	+41	+05
42.7865	4805.56	+30	+07	46.4976	4742.94	+51	+11
42.1030	4841.00	+08	−12	46.1608	4758.87	+37	−02
41.8180	4856.18	−01	−20	45.2229	4805.56	+67	+33
41.2918	4885.25	+15	00	44.529	4841.00	+16	−08
39.6410	*4981.91*	00	00	44.245	4856.18	+20	00
				42.0543	*4981.91*	00	+02
S_0	7.5171				10.3552		
c	63628.789				61749.228		
λ_0	3001.18				3033.93		
Reduction to Sun: λ 4400	t.m. +0.25				t.m. −0.01		
λ 5000	+0.29				−0.01		

115 *SCHJELLERUP*

Yellow-Green Region

Plate G 365				Plate G 374			
Mean Scale Reading	Wave-Length *Ti*	Δ_1	Δ_2	Mean Scale Reading	Wave-Length *Ti*	Δ_1	Δ_2
mm.	t.m.			mm.	t.m.		
45.5753	*5173.94*	00	+08	*46.4304*	*5173.94*	00	+01
45.0954	5193.15	−44	−32	45.9616	5193.15	+06	+12
44.6801	5210.55	−34	−20	45.5358	5210.55	−24	−15
41.8458	5336.96	+04	+08	42.688	5336.96	−09	+01
40.9233	*5381.20*	00	−12	*41.7645*	*5381.20*	00	+02
40.1694	5419.00	+31	+12	41.0031	5419.00	+10	+04
38.5433	5504.10	+28	+03	39.6318	5409.90	−05	−20
37.4348	5565.70	+23	+04	38.2585	5565.70	+21	+04
36.0934	*5644.37*	00	−06	36.9095	*5644.37*	00	−07
32.711	5866.69	−61	−45	....	....	....	....
S_0	−6.4285				−6.3081		
c	109710.332				112617.276		
λ_0	3064.28				3038.55		
Reduction to Sun: λ 5200	t.m. +0.29				+0.20		
λ 5800	+0.32				+0.22		

152 *SCHJELLERUP*—Blue Region

PLATE G 316				PLATE G 394			
Mean Scale Reading	Wave-Length *Fe*	Δ_1	Δ_2	Scale Mean Reading	Wave-Length *Ti*	Δ_1	Δ_2
mm.	t.m.			mm.	t.m.		
58.4979	*4404.93*	00	00	*62.2942*	*4387.01*	00	00
53.9627	4494.74	−28	+02	60.1744	4427.27	−04	+05
53.3353	4508.38	−05	+26	58.1132	4468.66	−17	+02
52.3887	4528.79	−34	−05	57.1631	4488.86	+04	+25
51.4690	4549.64	−18	+08	56.0399	4512.88	−25	−02
49.9958	4584.02	−15	+04	54.1548	4555.66	−21	+01
46.9014	*4661.67*	00	00	52.7090	4590.12	−20	−02
45.2818	4705.54	+12	00	50.7415	4639.77	+02	+09
42.4443	4788.37	+33	+01	*49.1495*	*4682.09*	00	−02
39.8347	4871.90	+30	00	47.0010	4742.98	+14	−01
38.3177	4924.12	+18	+01	44.9514	4805.44	+35	+14
37.3848	*4957.65*	00	−02	43.3770	4856.20	+17	−04
....	....	....	....	42.0906	4900.09	+23	+06
....	....	....	....	*39.8372*	*4981.91*	00	−02
S_0	−14.7723				−11.8813		
c	100044.671				101624.571		
λ^0	3039.51				3016.95		

		t.m.	t.m.
Reduction to Sun:	λ4400	−0.13	−0.15
	λ5000	−0.15	−0.17

152 *SCHJELLERUP*—Blue Region

PLATE A 313				PLATE A 319			
Mean Scale Reading	Wave-Length *Ti*	Δ_1	Δ_2	Mean Scale Reading	Wave-Length *Ti*	Δ_1	Δ_2
mm.	t.m.			mm.	t.m.		
37.5957	4417.88	+06	+02	*34.1864*	*4400.74*	−82	00
38.3621	*4427.27*	+01	00	36.4392	4427.28	−74	+02
40.7605	4457.59	−11	−04	37.7721	4443.97	−72	00
41.6063	4468.65	−09	00	38.8382	4457.59	−72	−04
42.5699	4481.41	−13	−02	40.6509	4482.84	−76	−13
44.0444	4501.43	−13	−01	42.1245	4501.43	−58	−03
44.8692	4512.88	−12	00	43.3250	4518.20	−45	+03
45.9009	4527.48	−09	+03	43.9798	4527.48	−03	+03
47.1070	4544.83	−13	−02	45.1841	4544.83	−36	+01
47.8423	4555.66	−10	00	45.9218	4555.64	−34	00
48.4016	4563.94	−14	−04	46.4787	4563.94	−30	00
48.9422	4572.15	−05	+03	48.2013	4590.11	−23	−03
50.1159	4590.11	−04	+01	49.9321	4617.41	−08	−04
51.8489	4617.41	00	−01	*50.2910*	*4623.24*	00	00
52.2117	*4623.24*	00	−03	51.3057	4639.75	+03	−05
53.2231	4639.85	+13	+06	52.9721	4667.76	+21	00
54.2324	4656.60	+10	00	53.8034	4682.08	+28	+01
54.8889	4667.76	+15	+03	57.1887	4742.94	+45	+01
55.7234	4682.08	+14	00	58.0670	4759.44	+46	−01
59.1079	4742.94	+20	−01	60.4270	4805.44	+53	+01
59.9186	4758.30 du	+33	+11	62.1738	4841.00	+48	−03
59.9866	4759.44	+18	−04	64.2508	4885.25	+48	+04
61.0582	4780.	....	....	*68.4778*	*4981.91*	00	−01
62.3381	4805.25	+18	−05	....	....	....	....
64.0888	4841.00	+21	−01	....	....	....	....
64.8097	4856.18	+27	+05	....	....	....	....
66.1663	4885.25	+18	00	....	....	....	....
66.8361	4900.08	+27	+11	....	....	....	....
67.4510	4913.76	+22	+08	....	....	....	....
70.3827	*4981.91*	00	00	....	....	....	....
S_0	151.4543				148.7024		
c	−158811.978				−155701.597		
λ_0	3023.00				3041.09		

		t.m.	t.m.
Reduction to Sun:	λ 4400	−0.13	+0.08
	λ 5000	−0.15	+0.10

152 *SCHJELLERUP*

Yellow-Green Region

Wave-Length *Fe*	Plate G 275			Plate G 291			Plate G 302		
	Mean Scale Reading	Δ_1	Δ_2	Mean Scale Reading	Δ_1	Δ_2	Mean Scale Reading	Δ_1	Δ_2
t.m.	mm.			mm.			mm.		
5169.19	46.8204	+63	+52	....	....	....	50.7350	+70	+53
5227.30	*45.3563*	−01	+01	*45.4829*	00	+06	*49.2714*	00	00
5233.12	45.2147	−04	00	....	....	....	49.1235	−30	−27
5269.72	44.3428	−19	00	44.4743	−22	−02	48.2586	−20	00
5328.24	43.0113	−25	−03	43.1478	−37	−12	46.9297	−19	00
5371.70	*42.0721*	−01	+10	*42.2151*	00	+07	*45.9897*	00	+07
5447.13	40.5139	00	+01	40.6580	−23	−20	44.4318	+03	−05
5586.99	37.8635	−36	−11	38.0212	−24	+11	41.7862	+06	00
5615.80	*37.3562*	−28	+01	*37.5066*	−63	−22	*41.2756*	00	−01
5710.75	*35.7619*	−01	+36	*35.9205*	00	−51	*39.6857*	+73	+84
1st Constants S_0	−7.4490			−7.7545			−3.9509		
1st Constants c	114977.007			117551.985			116954.193		
1st Constants λ_0	3049.92			3019.23			3029.83		
2d Constants S_0	−7.4458								
2d Constants c	114945.901								
2d Constants λ_0	3050.55								
Red. to Sun:	t.m.			t.m.			t.m.		
λ5200	+0.29			+0.22			0.00		
λ5800	+0.33			+0.26			0.00		

DETAILED MEASURES AND REDUCTIONS

The following tables contain the detailed measures and reductions, made by Mr. Parkhurst, of the spectra of eight fourth-type stars. The intensities of the lines were estimated on a scale of 10, but on account of variations in exposure time, etc., these numbers should be taken as only roughly approximate. The character of the line, whether dark (D) or bright (B), wide (w) or nebulous (n), is indicated in the second column. "Max." indicates the point of maximum intensity of a bright space. In the case of 19 *Piscium*, the first star measured, the red-right and red-left measures are given separately; for other stars the combined measures are given. The other details of the tables will be readily understood after reference to pp. 17–20.

19 *PISCIUM* = 273 *SCHJELLERUP*. PLATE G 264

1898, December 31, G.M.T. $12^{h}.5$. Hour angle, W $1^{h}.6$. Star fair; comparison fair.

Intensity	Character	Red Right		Red Left		Mean Wave-Length		
		Mean Scale Reading	Wave-Length Reduced to Sun	Mean Scale Reading	Wave-Length Reduced to Sun	Uncorrected	Cor. from Curve	Corrected
		mm.	t.m.	mm.	t.m.	t.m.		t.m.
1	D	49.4583	4375.83	....	....	75.83	+4	4375.87
10	w D	49.0257	4384.26	36.6497	4383.92	84.09	+2	4384.11
2-3	n D	48.7164	4390.35	36.9718	4390.26	90.31	+5	4390.36
5	wn D	48.4777	4395.09	37.2100	4394.98	95.04	+1	4395.05
1	n D	48.1790	4401.07	37.5230	4401.24	01.16	0	4401.16
3	B	48.1096	4402.46	37.5892	4402.56	02.51	−1	4402.50
10	w D	47.9844	4404.99	37.7133	4405.07	05.03	−1	4405.02
2	D	47.7966	4408.80	37.8839	4408.53	08.67	−1	4408.66
4 5	nn D	47.4732	4415.40	38.2109	4415.20	15.30	−2	4415.28
1	D	47.0949	4423.21	38.6028	4423.29	23.25	−3	4423.22
1	B	46.9227	4426.80	38.7784	4426.94	26.87	−3	4426.84
2	n D	46.8768	4427.76	38.8158	4427.72	27.74	−4	4427.70
3	n D	46.7556	4430.29	38.9412	4430.34	30.32	−4	4430.28
6-7	wn D	46.4910	4435.86	39.1935	4435.65	35.76	−5	4435.71
1	D	46.3786	4438.24	39.3215	4438.36	38.30	−5	4438.25
1-2	n D	45.9572	4447.24	39.7303	4447.08	47.32	−6	4447.26
3	n B	45.8900	4448.69	39.8206	4449.03	48.86	−6	4448.80
4-5	n D	45.8238	4450.11	39.8816	4450.30	50.21	−6	4450.15
2	n D	45.5807	4455.38	40.1234	4455.58	55.48	−7	4455.41
3-4	n D	45.2650	4462.28	40.4334	4462.35	62.32	−8	4462.24
4	wn B	45.1861	4464.01	40.5143	4464.12	64.07	−8	4463.99
1	n D	45.1212	4465.44	40.5767	4465.50	65.47	−8	4465.39
1	n D	44.9537	4469.14	40.7469	4469.26	69.20	−8	4469.12
1-2	n D	44.4648	4480.06	41.2307	4480.06	80.06	−9	4479.97
2	D	44.3735	4482.06	41.3301	4482.30	82.18	−9	4482.09
3	B	44.2939	4483.92	41.3986	4483.85	83.89	−9	4483.80
2	B	44.1962	4486.13	41.5013	4486.17	86.15	−9	4486.06
1-2	D	44.1344	4487.54	41.5647	4487.84	87.69	−9	4487.60
3	B	44.0846	4488.67	41.6159	4488.78	88.73	−9	4488.64
2-3	D	44.0336	4489.83	41.6631	4489.85	89.84	−9	4489.75
6	D	43.7130	4497.18	41.9863	4497.26	97.22	−9	4497.13
2-3	D	43.5090	4501.90	42.1834	4501.81	01.86	−9	4501.77
6	n D	43.2936	4506.91	42.3992	4506.83	06.87	−9	4506.78
1	D	43.1708	4509.78	42.5209	4509.68	09.73	−9	4509.64
...	wn D	43.0210	4513.31	42.6451	4512.60	12.96	−9	4512.87
2	n B	42.8573	4517.17	42.8380	4517.15	17.16	−8	4517.08
4	D	42.8054	4518.40	42.8875	4518.32	18.36	−8	4518.28
1	D	42.7142	4520.57	42.9886	4520.72	20.65	−8	4520.57
3-4	B	42.6637	4521.77	43.0323	4521.76	21.77	−8	4521.69
5	D	42.6061	4523.14	43.0869	4523.00	23.07	−7	4523.00
6	w D	42.4210	4527.58	43.2698	4527.44	27.51	−7	4527.44
2-3	n D	42.2569	4531.53	43.4331	4531.37	31.45	−7	4531.38
3-4	D	42.0727	4535.99	43.6198	4535.89	35.94	−7	4535.87
3	B	42.0109	4537.49	43.6835	4537.44	37.47	−7	4537.40
3	B	41.9467	4539.06	43.7505	4539.07	39.07	−7	4539.00
3	D	41.8845	4540.58	43.8122	4540.58	40.58	−7	4540.51
1	D	41.7920	4542.84	....	....	42.84	−6	4542.78
2	B	41.7382	4544.16	43.9612	4544.22	44.19	−6	4544.13
3	B	41.5867	4547.89	44.1094	4547.87	47.88	−6	4547.82
5	D	41.5253	4549.41	44.1622	4549.17	49.29	−6	4549.23
10	w D	41.3521	4553.70	44.3387	4553.55	53.63	−6	4553.57
Limits {	....	....	....	44.2780	4552.04	52.04	−6	4551.98
	....	....	....	44.3920	4554.87	54.87	−6	4554.81
3	D	41.0837	4560.40	44.6095	4560.31	60.36	−5	4560.31
3	n B	41.0220	4561.95	44.6776	4562.02	61.99	−5	4561.94
2-3	D	40.9601	4563.51	44.7490	4563.82	63.67	−5	4563.62
1	D	40.8795	4565.55	44.8262	4565.76	65.66	−4	4565.62
...	w D	40.6343	4571.76	45.0599	4571.69	71.73	−4	4571.69
2	n B	40.1663	4583.78	45.5262	4583.65	83.72	−2	4583.70
1	D	40.1297	4584.72	45.5658	4584.68	84.70	−2	4584.68
1	B	40.1032	4585.41	45.5976	4585.50	85.46	−2	4585.44
2	n D	40.0609	4586.51	45.6273	4586.27	86.39	−2	4586.37
1	D	39.8898	4590.96	45.8109	4591.05	91.01	−2	4590.99
2-3	n D	39.7594	4594.37	45.9398	4594.42	94.41	−2	4594.39
2	B	39.7022	4595.88	45.9924	4595.81	95.85	−2	4595.83
1	D	39.5104	4600.93	46.1851	4600.88	00.91	−1	4600.90

19 *PISCIUM* = 273 *SCHJELLERUP*. PLATE G 264 — *Continued*

Intensity	Character	Red Right		Red Left		Mean Wave-Length		
		Mean Scale Reading	Wave-Length Reduced to Sun	Mean Scale Reading	Wave-Length Reduced to Sun	Uncor-rected	Cor. from Curve	Corrected
		mm.	t.m.	mm.	t.m.	t.m.		t.m.
10	w D	39.2826	4606.98	46.4155	4607.00	06.99	0	4606.99
2–3	n B	39.2156	4608.77	46.4797	4608.71	08.74	0	4608.74
1–2	B	39.0789	4612.43	46.6124	4612.26	12.35	0	4612.35
1	n D	39.0230	4613.93	46.6604	4613.55	13.74	0	4613.74
3	B	38.9832	4615.00	46.7142	4615.00	15.00	+1	4615.01
2	D	38.9309	4616.41	46.7644	4616.35	16.38	+1	4616.39
6	B	38.8783	4617.83	46.8188	4617.82	17.83	+1	4617.84
4	D	38.8059	4619.79	46.8866	4619.65	19.72	+1	4619.73
3	B	38.7468	4621.39	46.9497	4621.31	21.35	+2	4621.37
1	n D	38.6947	4622.81	46.9974	4622.66	22.74	+2	4622.76
4–5	n D	38.4561	4629.32	47.2366	4629.19	29.26	+2	4629.28
3	B	38.3865	4631.23	47.3098	4631.20	31.22	+3	4631.25
1	D	38.2639	4634.61	47.4331	4634.60	34.61	+3	4634.64
2	D	38.1573	4637.56	47.5330	4637.36	37.46	+3	4637.49
3	B	38.1179	4638.65	47.5759	4638.55	38.60	+3	4638.63
5–6	D	38.0556	4640.38	47.6452	4640.47	40.43	+4	4640.47
3	B	38.0055	4641.78	47.6880	4641.66	41.72	+4	4641.76
...	wn D	37.8532	4646.03	47.8299	4645.62	45.82	+4	4645.86
2–3	B	37.6106	4652.85	48.0828	4652.73	52.79	+4	4652.83
1	D	37.5764	4653.82	48.1234	4653.88	53.85	+4	4653.89
1	D	37.4837	4656.44	48.2069	4656.24	56.34	+5	4656.39
...	w B	37.3245	4660.97	48.3673	4660.80	60.89	+5	4660.94
1–2	D	37.2123	4664.18	48.4810	4664.05	64.12	+5	4664.17
2	n B	37.1721	4665.33	48.5299	4665.45	65.39	+5	4665.44
3	wn D	37.0754	4668.11	48.6189	4668.01	68.06	+5	4668.11
4	D	36.8324	4675.13	48.8631	4675.07	75.10	+6	4675.16
1	D	36.5878	4682.26	....	....	82.26	+6	4682.32
1	n D	36.3793	4688.39	....	....	88.39	+7	4688.46
1	n D	36.2891	4691.05	49.4104	4691.11	91.08	+7	4691.15
1	n D	....	....	49.5178	4694.29	94.29	+7	4694.36
3–4	n D	36.1039	4696.55	49.5915	4696.48	96.52	+7	4696.59
6	w D	35.5052	4714.58	50.1909	4714.53	14.56	+8	4714.64
1–2	n D	35.2360	4722.82	50.4498	4722.45	22.64	+8	4722.72
10	w D	34.8071	4736.11	50.8826	4735.86	35.99	+8	4736.07
Head	....	34.7613	4737.54	50.9412	4737.69	37.62	+8	4737.70
7–8	B	34.7296	4738.53	50.9701	4738.60	38.57	+8	4738.65
4–5	n D	34.5568	4743.96	51.1416	4743.99	43.98	+8	4744.06
7	B	34.4729	4746.61	....	....	46.61	+8	4746.69
1	n D	34.3734	4749.77	51.3189	4749.60	49.69	+8	4749.77
1–2	n D	34.0980	4758.55	51.5904	4758.26	58.41	+8	4758.49
1	D	33.8663	4766.01	51.8205	4765.67	65.84	+7	4765.91
1	D	33.6630	4772.61	52.0336	4772.58	72.60	+7	4772.67
1	n D	33.3151	4784.03	52.3886	4784.24	84.14	+6	4784.20
1	n D	33.1489	4789.53	52.5391	4789.22	89.38	+6	4789.44
1	n D	32.3595	4816.17	53.3197	4815.55	15.86	+4	4815.90
1–2	n D	32.1309	4824.19	53.5543	4823.62	23.91	+3	4823.94
1	n D	32.0206	4827.86	53.6702	4827.64	27.75	+3	4827.78
1	n D	31.8764	4832.87	53.8143	4832.65	32.76	+2	4832.78
1	n D	31.2362	4855.50	54.4570	4855.37	55.44	0	4855.44
1	n D	30.8755	4868.50	54.8195	4868.44	68.47	−2	4868.45
1	n D	30.5171	4881.67	55.1792	4881.60	81.64	−4	4881.60
End	....	27.5040	4999.7	....	....	99.7	−10	4999.6

19 *PISCIUM* = 273 *SCHJELLERUP*. PLATE G 343

1899, October 4, G.M.T. $15^h.5$. Hour angle, E $1^h.3$. Star good; comparison excellent.

8	w D	50.0071	4394.56	38.3322	4394.17	94.37	+18	4394.55
1	D	49.8543	4397.46	38.4965	4397.29	97.38	+18	4397.56
3	D	49.6999	4400.40	38.6522	4400.25	00.33	+18	4400.51
4	D	49.4703	4404.79	38.8807	4404.62	04.71	+17	4404.88
4	D	49.2874	4408.31	39.0533	4407.95	08.13	+17	4408.30
1	D	49.0913	4412.11	39.2609	4411.96	12.04	+16	4412.20
2	wn D	48.9511	4414.84	39.4076	4414.82	14.83	+16	4414.99
2–3	wn D	48.6688	4420.38	39.6904	4420.35	20.37	+14	4420.51

19 *PISCIUM* = 273 *SCHJELLERUP*. PLATE G 343—*Continued*

INTENSITY	CHARACTER	RED RIGHT		RED LEFT		MEAN WAVE-LENGTH		
		Mean Scale Reading	Wave-Length Reduced to Sun	Mean Scale Reading	Wave-Length Reduced to Sun	Uncor-rected	Cor. from Curve	Corrected
		mm.	t.m.	mm.	t.m.	t.m.		t.m.
1–2	D	48.5498	4422.70	39.8116	4422.73	22.72	+13	4422.85
1–2	D	48.3316	4427.01	40.0362	4427.17	27.09	+12	4427.21
1–2	n D	48.1800	4430.03	40.1655	4429.74	29.89	+12	4430.01
3	n D	47.9267	4435.09	40.4406	4435.24	35.17	+10	4435.27
1	n D	47.7822	4437.99	40.5721	4437.68	37.84	+10	4437.94
2	B	47.7447	4438.75	40.6101	4438.65	38.70	+10	4438.80
2–3	n D	47.4727	4444.25	40.8899	4444.31	44.28	+ 8	4444.36
1	n D	47.3391	4446.97	41.0111	4446.78	46.88	+ 8	4446.96
2	n B	47.2673	4448.44	41.0901	4448.39	48.42	+ 7	4448.49
5	n D	47.2070	4449.67	41.1482	4449.58	49.63	+ 7	4449.70
1	D	47.0381	4453.13	41.3196	4453.09	53.11	+ 6	4453.17
3	n D	46.9446	4455.06	41.4083	4454.92	54.99	+ 6	4455.05
2	n D	46.6047	4462.11	41.7445	4461.89	62.00	+ 4	4462.04
3	w B	46.5158	4463.96	41.8452	4463.99	63.98	+ 4	4464.02
1	D	46.4568	4465.19	41.8949	4465.01	65.10	+ 3	4465.13
1–2	D	46.2890	4468.71	42.0685	4468.47	68.59	+ 3	4468.62
1	D	46.0997	4471.70	42.2541	4472.58	72.14	+ 2	4472.16
1–2	n D	45.9673	4475.51	42.3834	4475.32	75.42	+ 1	4475.43
1–2	n D	45.7601	4479.91	42.6037	4480.01	79.96	0	4479.96
3	n D	45.6485	4482.30	42.7043	4482.16	82.23	0	4482.23
2	n B	45.5985	4483.37	42.7624	4483.40	83.39	− 1	4483.38
1–2	n D	45.4012	4487.62	42.9453	4487.34	87.48	− 1	4487.47
2-3	D	45.3018	4489.76	43.0516	4489.63	89.70	− 2	4489.68
3	n D	44.9705	4496.97	43.3809	4496.79	96.88	− 3	4496.85
5	n D	44.7524	4501.75	43.6090	4501.79	01.77	− 5	4501.72
6–7	D	44.5174	4506.93	43.8266	4506.59	06.76	− 6	4506.70
1	D	44.3840	4509.89	....	....	09.89	− 6	4509.83
...	wn D	44.2512	4512.85	44.0902	4512.45	12.65	− 7	4512.58
3	D	44.0040	4518.39	44.3443	4518.14	18.27	− 7	4518.20
3	D	43.7945	4523.12	44.5553	4522.90	23.01	− 8	4522.93
4	nn D	....	....	44.7429	4527.16	27.16	− 9	4527.07
2	D	43.4324	4531.35	....	....	31.35	− 9	4531.26
9	D	43.2400	4535.80	45.0941	4535.19	35.50	−10	4535.40
3	n B	43.1721	4537.34	45.1821	4537.22	37.28	−10	4537.18
2	B	43.0953	4539.11	45.2577	4538.97	39.04	−10	4538.97
1	D	43.0385	4540.42	45.3146	4540.29	40.36	−10	4540.26
2	D	42.8291	4545.29	45.5259	4545.19	45.24	−10	4545.14
5	wn D	42.6501	4549.47	45.6961	4549.17	49.32	−11	4549.21
...	w D	42.4800	4553.50	45.8860	4553.62	53.56	−11	4553.45
3	nn D	42.1870	4560.40	46.1819	4560.63	60.52	−12	4560.40
2–3	D	42.0670	4563.30	46.2803	4562.98	63.14	−12	4563.02
1–2	n D	41.9547	4565.94	46.4000	4565.84	65.89	−12	4565.77
9	w D	41.7074	4571.88	46.6357	4571.50	71.69	−12	4571.57
3	n D	41.5659	4575.30	46.7910	4575.25	75.28	−12	4575.16
3–4	n D	41.4591	4577.90	46.8740	4577.26	77.60	−12	4577.48
1	D	41.3520	4580.51	47.0021	4580.39	80.45	−12	4580.33
1	D	41.2903	4582.01	47.0640	4581.90	81.96	−12	4581.84
1–2	D	41.1819	4584.67	47.1639	4584.35	84.51	−12	4584.39
2	n D	41.1100	4586.43	47.2458	4586.36	86.40	−12	4586.28
1	n D	40.9181	4591.16	47.4355	4591.03	91.10	−12	4590.98
2	n D	40.7915	4594.30	47.5709	4594.39	94.35	−12	4594.23
1	n D	40.6562	4597.66	47.6937	4597.44	97.55	−12	4597.43
2	n D	40.5229	4600.99	47.8234	4600.68	00.84	−12	4600.72
8	wn D	40.2880	4606.90	48.0610	4606.65	06.78	−12	4606.66
1	n D	40.1482	4610.43	48.1843	4609.77	00.10	−12	4609.98
1–2	nn D	40.0085	4613.98	48.3444	4613.84	13.91	−12	4613.79
3	B	39.9655	4615.08	48.3848	4614.87	14.98	−12	4614.86
3	D	39.9165	4616.33	48.4351	4616.15	16.24	−11	4616.13
6	B	39.8578	4617.83	48.4987	4617.77	17.80	−11	4617.69
5–6	D	39.7825	4619.76	48.5691	4619.58	19.67	−11	4619.56
4–5	B	39.7178	4621.42	48.6366	4621.31	21.37	−11	4621.26
2	n D	39.6553	4623.02	48.6987	4622.78	22.90	−11	4622.79
5	D	39.4078	4629.42	48.9408	4629.16	29.29	−11	4629.18
5	B	39.3374	4631.25	49.0095	4630.95	31.10	−11	4630.99
3	B	39.0427	4638.95	49.3118	4638.85	38.90	−10	4638.80
6	D	38.9875	4640.26	49.3564	4640.02	40.14	−10	4640.04
4	B	....	....	49.4215	4641.76	41.76	−10	4641.66
1	D	38.4620	4654.22	....	....	54.22	− 9	4654.13

19 *PISCIUM* = 273 *SCHJELLERUP*. PLATE G 343—*Continued*

INTENSITY	CHARACTER	RED RIGHT		RED LEFT		MEAN WAVE-LENGTH		
		Mean Scale Reading	Wave-Length Reduced to Sun	Mean Scale Reading	Wave-Length Reduced to Sun	Uncorrected	Cor. from Curve	Corrected
		mm.	t.m.	mm.	t.m.	t.m.		t.m.
1	D	....	....	49.9950	4656.90	56.90	− 9	4656.81
10	D	35.5381	4736.38	....	....	36.38	0	4736.38
Head	....	35.4988	4737.54	....	....	37.54	0	4737.54
8	B	35.4654	4738.53	52.8867	4738.51	38.52	+ 1	4738.53
1	D	35.4245	4739.74	52.9286	4739.76	39.75	+ 1	4739.76
10	w D	35.2837	4743.92	53.0573	4743.58	43.75	+ 1	4743.76
6	B	35.2043	4746.29	53.1533	4746.23	46.26	+ 2	4746.28
2–3	n D	35.1009	4749.38	53.2585	4749.38	49.38	+ 2	4749.40
3	B	34.9146	4754.98	53.4435	4754.94	54.96	+ 2	4754.98
1	D	34.8816	4755.98	53.4860	4756.23	56.11	+ 3	4756.14
2	B	34.8534	4756.83	53.5053	4756.81	56.82	+ 3	4756.85
4-5	D	34.8067	4758.24	53.5524	4758.24	58.24	+ 3	4758.27
1	D	34.5459	4766.18	53.8148	4766.22	66.20	+ 4	4766.24
2	nn D	34.3475	4772.26	54.0091	4772.18	72.22	+ 4	4772.26
3	nn D	33.9685	4784.00	54.3919	4784.04	84.02	+ 5	4784.07
2	n D	33.7998	4789.28	54.5603	4789.31	89.30	+ 6	4789.36
2–3	n D	32.9754	4815.52	55.3857	4815.60	15.56	+ 7	4815.63
1–2	n D	32.6015	4827.68	55.7579	4827.71	27.70	+ 7	4827.77
2	n D	32.4702	4831.99	55.8949	4832.21	32.10	+ 7	4832.17
1	n D	32.3447	4836.13	56.0150	4836.17	36.15	+ 6	4836.21
1	n D	32.2511	4839.22	56.1065	4839.20	39.21	+ 6	4839.27
1	D	....	....	56.2309	4843.34	43.34	+ 6	4843.40
2	nn D	....	....	56.5819	4855.11	55.11	+ 6	4855.17
1	n D	....	....	56.7058	4859.31	59.31	+ 6	4859.37
3–4	n D	30.9979	4881.76	57.3555	4881.61	81.69	+ 2	4881.71
2	nn D	30.4566	4900.75	57.8980	4900.66	00.71	+ 1	4900.72
1	nn D	....	....	58.4450	4920.25	20.25	− 2	4920.23

19 *PISCIUM* = 273 *SCHJELLERUP*. PLATE G 259

1898, December 29, G.M.T. 11ʰ6. Hour angle, W 0ʰ6. Star fair; comparison good.

INTENSITY	CHARACTER	RED RIGHT		RED LEFT			MEAN WAVE-LENGTH		
		Mean Scale Reading	Wave-Length Reduced to Sun	Mean Scale Reading	Red. to Sun	Wave-Length Reduced to Sun	Uncorrected	Cor. from Curve	Corrected
		mm.	t.m.	mm.		t.m.	t.m.		t.m.
1-2	nn B	42.3913	5170.28	47.3039	− 41	70.50	70.39	+15	5170.54
10	wn D	....	....	47.3712	− 41	73.33	73.33	+15	5173.48
1	B	41.9086	5190.72	47.7853	− 41	90.90	90.81	+13	5190.94
4	D	41.8593	5192.83	47.8180	− 41	92.30	92.57	+12	5192.69
2	nn B	41.7703	5196.65	47.9262	− 41	96.94	96.80	+12	5196.92
1	B	41.6084	5203.64	48.0819	− 41	03.66	03.66	+10	5203.76
3-4	n B	41.3675	5214.12	48.3318	− 41	14.54	14.33	+ 7	5214.40
1	n D	41.3137	5216.47	48.3753	− 41	16.44	16.46	+ 7	5216.53
3-4	n B	41.2667	5218.53	48.4328	− 41	18.96	18.75	+ 7	5218.82
10	w D	41.0846	5226.55	48.5935	− 42	26.03	26.29	+ 5	5226.34
1	B	41.0258	5229.16	48.6722	− 42	29.52	29.34	+ 4	5229.38
2	D	40.9115	5234.22	48.7755	− 42	34.11	34.17	+ 2	5234.19
5	wn B	40.8582	5236.61	48.8388	− 42	36.93	36.72	+ 1	5236.73
3–4	B	40.6661	5245.22	49.0252	− 42	45.28	45.25	− 2	5245.23
5	D	40.6226	5247.18	49.0744	− 42	47.50	47.34	− 2	5247.32
1-2	n B	40.5786	5249.16	49.1177	− 42	49.45	49.31	− 3	5249.28
1-2	D	40.5278	5251.46	49.1635	− 42	51.52	51.49	− 3	5251.46
1	nn D	40.4412	5255.38	49.2633	− 42	56.05	55.72	− 5	5255.67
6	nn D	40.1159	5270.25	49.5781	− 42	70.44	70.35	− 8	5270.27
2	nn B	39.9184	5279.38	49.7770	− 42	79.63	79.51	− 8	5279.43
1-2	nn D	39.8252	5283.71	49.8722	− 42	84.05	83.88	− 9	5283.79
4	n D	39.5207	5297.98	50.1716	− 42	98.09	98.04	−10	5297.94
3	n D	39.4195	5302.76	50.2715	− 42	02.81	02.79	−10	5302.69
4	n B	39.3734	5304.95	50.3224	− 42	05.23	05.09	− 9	5305.00
2	n B	39.2044	5313.00	50.4890	− 42	13.16	13.08	− 9	5312.99
1	D	39.1691	5314.69	50.5244	− 42	14.86	14.78	− 9	5314.69

19 *PISCIUM* = 273 *SCHJELLERUP*. PLATE G 259—*Continued*

Intensity	Character	Red Right: Mean Scale Reading	Red Right: Wave-Length Reduced to Sun	Red Left: Mean Scale Reading	Red Left: Red. to Sun	Red Left: Wave-Length Red. to Sun	Mean Wave-Length: Uncorrected	Mean Wave-Length: Cor. from Curve	Mean Wave-Length: Corrected
		mm.	t.m.	mm.		t.m.	t.m.		t.m.
4	nn B	39.0968	5318.16	50.5956	− 42	18.26	18.21	− 9	5318.12
1	B	39.0021	5322.72	50.6999	− 43	23.28	23.00	− 8	5322.92
10	w D	38.8775	5329.05	50.8212	− 43	29.14	29.10	− 7	5329.03
5-6	wn B	38.6757	5338.88	51.0327	− 43	39.44	39.16	− 5	5339.11
1	D	38.6294	5341.14	51.0697	− 43	41.26	41.20	− 5	5341.15
2	wn D	38.4432	5350.30	51.2497	− 43	50.11	50.21	− 2	5350.19
2	n B	38.3991	5352.46	51.3054	− 43	52.86	52.66	− 2	5352.64
8	wn D	38.0117	5371.82	51.6930	− 43	72.21	72.02	+ 4	5372.06
6	B	37.9536	5374.75	51.7509	− 43	75.13	74.94	+ 4	5374.98
1	n D	37.9101	5376.94	51.7913	− 43	77.17	77.06	+ 4	5377.10
2-3	n D	37.5143	5397.13	52.1880	− 43	97.39	97.26	+ 17	5397.43
2-3	n B	37.3952	5403.27	52.3111	− 43	03.74	03.51	+ 19	5403.70
0-1	n D	37.3455	5405.84	52.3572	− 43	06.13	05.99	+ 20	5406.19
2	n B	37.3077	5407.80	52.3975	− 43	08.21	08.01	+ 22	5408.23
2-3	n D	37.2680	5409.86	52.4355	− 43	10.19	10.03	+ 22	5410.25
2-3	n B	37.2237	5412.17	52.4764	− 43	12.32	12.25	+ 22	5412.47
7-8	B	37.1286	5417.13	52.5694	− 43	17.17	17.15	+ 23	5417.38
2-3	n D	37.0772	5419.83	52.6253	− 43	20.10	19.97	+ 24	5420.21
4	B	37.0163	5423.03	52.6768	− 43	22.80	22.92	+ 24	5423.16
3	n B	36.9261	5427.78	52.7762	− 44	28.02	27.90	+ 25	5428.15
2	n D	36.8838	5430.01	52.8179	− 44	30.23	30.12	+ 25	5430.37
2	B	36.8507	5431.77	52.8541	− 44	32.14	31.96	+ 25	5432.21
5-6	B	36.5954	5445.37	53.0982	− 44	45.14	45.26	+ 25	5445.51
4	n D	36.5472	5447.95	53.1541	− 44	48.14	48.05	+ 25	5448.30
4	n B	36.4986	5450.56	53.2079	− 44	51.03	50.80	+ 25	5451.05
4-5	n B	36.4389	5453.73	53.2661	− 44	54.16	53.95	+ 24	5454.19
1	n D	36.3832	5456.79	53.3184	− 44	56.99	56.89	+ 24	5457.13
2-3	n B	36.3477	5458.71	53.3590	− 44	59.19	58.95	+ 24	5459.19
2	B	36.2779	5462.50	53.4243	− 44	62.73	62.62	+ 22	5462.84
2	B	36.2277	5465.23	53.4687	− 44	65.14	65.19	+ 22	5465.41
3	n B	36.1098	5471.67	53.5926	− 44	71.91	71.79	+ 20	5471.99
4-5	B	35.9516	5480.37	53.7442	− 44	80.23	80.30	+ 20	5480.50
2	D	35.9179	5482.23	53.7857	− 44	82.52	82.38	+ 14	5482.52
2-3	B	35.6763	5495.65	54.0230	− 44	95.70	95.68	+ 9	5495.77
2-3	D	35.6359	5497.91	54.0625	− 44	97.91	97.91	+ 7	5497.98
1	nn D	35.5692	5501.64	54.1385	− 44	02.16	01.90	+ 6	5501.96
1	D	35.4805	5506.63	54.2208	− 44	06.79	06.71	+ 5	5506.76
2	n B	35.4377	5509.05	54.2629	− 44	09.16	09.11	+ 4	5509.15
1-2	B	35.4032	5511.00	54.2908	− 44	10.74	10.87	+ 3	5510.90
1	D	35.0960	5528.50	54.6018	− 45	28.43	28.47	− 2	5528.45
2	n D	34.8999	5539.80	54.8020	− 45	39.96	39.88	− 2	5539.86
1	n D	34.7605	5547.90	54.9421	− 45	48.09	48.00	− 5	5547.95
1	D	34.5117	5562.48	55.1884	− 45	62.52	62.50	− 8	5562.42
3	B	34.4790	5564.40	55.2197	− 45	64.36	64.38	− 8	5564.30
1	D	34.4454	5566.40	55.2536	− 45	66.36	66.38	− 9	5566.29
1	B	34.1990	5581.05	55.4956	− 45	80.75	80.90	− 10	5580.80
8	w D	34.1483	5584.09	55.5469	− 45	83.81	83.95	− 11	5583.84
3	B	34.1001	5586.99	55.5970	− 45	86.82	86.91	− 11	5586.80
5	B	33.9318	5597.15	55.7733	− 45	97.45	97.30	− 15	5597.15
1	D	33.7340	5609.19	55.9694	− 45	09.38	09.29	− 16	5609.13
1-2	B	33.6017	5617.31	56.0956	− 45	17.12	17.22	− 18	5617.04
2	n D	33.4768	5625.03	56.2165	− 46	24.57	24.80	− 20	5624.60
8	n D	33.3240	5634.53	56.3731	− 46	34.29	34.42	− 21	5634.21
Head	....	33.2937	5636.42	56.3994	− 46	35.93	36.18	− 22	5635.96
4	B	32.9891	5655.59	56.7067	− 46	55.25	55.42	− 24	5655.18
1	D	32.7514	5670.76	56.9552	− 46	71.10	70.93	− 27	5670.67
4	B	32.7059	5673.68	56.9978	− 46	73.83	73.76	− 27	5673.49
2	B	32.5241	5685.43	57.1765	− 46	85.35	85.39	− 29	5685.10
1	D	32.4993	5687.04	57.2066	− 46	87.30	87.17	− 29	5686.88
5	B	32.2264	5704.89	57.4762	− 46	04.92	04.91	− 30	5704.61
2	n B	32.1462	5710.18	57.5524	− 46	09.94	10.06	− 32	5709.74
6	B	32.0245	5718.25	....	.. ..	.....	18.25	− 33	5717.92
8	n B	....	....	57.7693	− 47	24.33	24.33	− 33	5724.00

19 *PISCIUM* = 273 *SCHJELLERUP*. PLATE G 269

1899, January 6, G.M.T. $12^h.3$. Hour angle, W $1^h.9$. Star excellent; comparison fair.

Intensity	Character	Red Right: Mean Scale Reading	Red Right: Wave-Length Reduced to Sun	Red Left: Mean Scale Reading	Red Left: Red. to Sun	Red Left: Wave-Length Red. to Sun	Mean Wave-Length: Uncorrected	Mean Wave-Length: Cor. by Curve	Mean Wave-Length: Corrected
		mm.	t.m.	mm.		t.m.	t.m.		t.m.
Head	....	45.4603	5167.99	40.2512	−49	68.46	68.23	+25	5168.48
3	B	45.3811	5171.09	40.3168	−49	71.03	71.06	+25	5171.31
7	D	45.3160	5173.64	40.3754	−49	73.34	73.49	+24	5173.73
7	n D	45.0750	5183.14	40.6286	−49	83.35	83.25	+21	5183.46
2	n B	44.9766	5187.14	40.7239	−49	87.15	87.15	+21	5187.36
4	B	44.8689	5191.32	40.8267	−49	91.26	91.29	+20	5191.49
3	D	44.8188	5193.32	40.8691	−49	92.96	93.14	+20	5193.34
6	B	44.2930	5214.55	41.4087	−49	14.81	14.68	+17	5214.85
1–2	D	44.2419	5216.63	41.4563	−49	16.76	16.70	+16	5216.86
5	B	44.1930	5218.63	41.5093	−49	18.94	18.79	+15	5218.94
7	D	43.9928	5226.85	41.6988	−50	26.74	26.80	+13	5226.93
3–4	B	43.9293	5229.47	41.7817	−50	30.18	29.83	+12	5229.95
5	D	43.8077	5234.51	41.8894	−50	34.66	34.59	+10	5234.69
4	B	43.7406	5237.30	41.9542	−50	37.36	37.33	+ 9	5237.42
1	D	43.6673	5240.38	42.0263	−50	40.38	40.38	+ 9	5240.47
2–3	B	43.5427	5245.57	42.1574	−50	45.88	45.73	+ 7	5245.80
7	D	43.4924	5247.69	42.2067	−50	47.96	47.83	+ 6	5247.89
5–6	D	43.3967	5251.72	42.2991	−50	51.86	51.79	+ 5	5251.84
1	D	43.2901	5256.20	42.4038	−50	56.30	56.25	+ 3	5256.28
6	D	42.9589	5270.35	42.7438	−50	70.84	70.62	− 2	5270.60
3	B	42.7353	5279.99	42.9646	−50	80.39	80.19	− 6	5280.13
1	n D	42.6542	5283.51	43.0562	−50	84.38	83.95	− 8	5283.87
6	D	42.3145	5298.37	43.3829	−50	98.70	98.54	−13	5298.41
2	D	42.2188	5302.59	43.4734	−50	02.70	02.65	−13	5302.52
2	B	41.9776	5313.30	43.7196	−50	13.66	13.48	−15	5313.33
1	n D	41.9277	5315.53	43.7670	−50	15.79	15.66	−15	5315.51
6	B	41.8758	5317.85	43.8262	−50	18.44	18.15	−15	5318.00
1–2	D	41.8223	5320.24	43.8901	−51	21.30	20.77	−15	5320.62
6	D	41.6267	5329.06	44.0755	−51	29.68	29.37	−15	5329.22
3–4	B	41.3948	5339.60	44.2982	−51	39.83	39.72	−13	5339.59
2	D	41.3565	5341.35	44.3428	−51	41.87	41.61	−11	5341.50
3	w D	41.1681	5350.01	44.5278	−51	50.38	50.20	− 8	5350.12
2–3	B	41.1065	5352.85	44.5875	−51	53.14	53.00	− 8	5352.92
1	D	40.8959	5362.63	44.8062	−51	63.31	62.97	− 2	5362.95
1	D	40.8064	5366.81	44.9063	−51	67.99	67.40	− 1	5367.39
2–3	B	40.7695	5368.53	44.9336	−51	69.27	68.90	− 1	5368.89
9	D	40.7048	5371.57	44.9855	−51	71.71	71.64	0	5371.64
8–9	B	40.6295	5375.11	45.0693	−51	75.66	75.39	+ 1	5375.40
2	B	....	....	45.1858	−51	81.17	81.17	+ 1	5381.18
1	D	40.2892	5391.26	45.4146	−51	92.07	91.67	+10	5391.77
3	B	40.2482	5393.22	45.4463	−51	93.59	93.41	+11	5393.52
3	D	40.1643	5397.25	45.5351	−51	97.85	97.55	+12	5397.67
2	B	40.0238	5404.02	45.6695	−51	04.33	04.18	+15	5404.33
1	n D	39.9786	5406.20	45.7264	−51	07.09	06.65	+16	5406.81
2–3	D	39.8862	5410.68	45.8061	−51	10.96	10.82	+17	5410.99
1–2	B	39.8504	5412.42	45.8455	−51	12.87	12.65	+17	5412.82
6–7	B	39.7521	5417.22	45.9384	−51	17.41	17.32	+17	5417.49
2–3	D	39.6920	5420.15	46.0028	−52	20.55	20.35	+18	5420.53
5–6	B	39.6286	5423.26	46.0615	−52	23.43	23.35	+18	5423.53
1	D	39.5843	5425.44	46.1077	−52	25.71	25.58	+18	5425.76
5	B	39.5389	5427.68	46.1533	−52	27.95	27.82	+18	5428.00
4	D	39.4848	5430.34	46.2075	−52	30.63	30.49	+18	5430.67
3	B	39.4474	5432.19	46.2483	−52	32.65	32.42	+19	5432.61
1	D	39.4041	5434.34	46.2889	−52	34.66	34.50	+19	5434.69
4–5	n B	39.1864	5445.19	46.5008	−52	45.22	45.21	+19	5445.40
6	D	39.1278	5448.12	46.5619	−52	48.28	48.20	+18	5448.38
3	B	39.0625	5451.40	46.6228	−52	51.34	51.37	+18	5451.55
3	B	39.0108	5454.00	46.6817	−52	54.31	54.16	+18	5454.34
2–3	D	38.9571	5456.72	46.7369	−52	57.10	56.91	+17	5457.06
1–2	B	38.9104	5459.08	46.7855	−52	59.55	59.32	+17	5459.49
1	D	....	....	46.8177	−52	61.19	61.19	+17	5461.36
3	B	38.8250	5463.40	46.8675	−52	63.72	63.56	+16	5463.72
1	w D	38.7310	5468.20	46.9599	−52	68.42	68.31	+16	5468.47
2	B	38.6466	5472.51	47.0445	−52	72.74	72.63	+15	5472.78
1	D	38.6092	5474.43	47.0871	−52	74.92	74.68	+14	5474.82
1	D	38.5440	5477.78	47.1499	−52	78.15	77.97	+13	5478.10

19 *PISCIUM*=273 *SCHJELLERUP.* PLATE G 269—*Continued*

Intensity	Character	Red Right		Red Left			Mean Wave-Length		
		Mean Scale Reading	Wave-Length Reduced to Sun	Mean Scale Reading	Red. to Sun	Wave-Length Red. to Sun	Uncor-rected	Cor. from Curve	Corrected
		mm.	t.m.	mm.		t.m.	t.m.		t.m.
4	B	38.4941	5480.35	47.1969	−52	80.57	80.46	+13	5480.59
2	D	38.4410	5483.09	47.2447	−52	83.03	83.06	+13	5483.19
1–2	B	....	....	47.5016	−52	96.37	96.37	+10	5496.47
4–5	D	38.1482	5498.31	47.5434	−52	98.56	98.44	+10	5498.54
1–2	n D	38.0711	5501.37	47.6185	−52	02.49	01.93	+ 9	5502.02
0–1	D	....	....	47.7153	−52	07.58	07.58	+ 8	5507.66
1	D	37.8741	5512.73	47.8232	−52	13.27	13.00	+ 6	5513.06
1–2	D	37.6441	5524.96	48.0453	−53	25.07	25.02	+ 3	5525.05
1	n D	37.5802	5528.38	....	−53	.....	28.38	+ 3	5528.41
2–3	B	37.5105	5532.12	48.1754	−53	32.04	32.08	+ 2	5532.10
1	D	37.4711	5534.25	48.2205	−53	34.47	34.36	+ 1	5534.37
8	n D	37.3756	5539.40	48.3267	−53	40.20	39.80	− 1	5539.79
6	B	37.2942	5543.81	48.3952	−53	43.91	43.86	− 2	5543.84
1	D	37.2023	5548.81	48.4840	−53	48.73	48.77	− 2	5548.75
3	B	37.0998	5554.42	48.5945	−53	54.76	54.59	− 4	5554.55
1	D	37.0639	5556.38	48.6355	−53	57.00	56.68	− 4	5556.64
1	n D	36.9497	5562.66	48.7458	−53	63.07	62.87	− 6	5562.81
2–3	B	36.9118	5564.75	48.7787	−53	64.88	64.82	− 7	5564.75
3	D	36.8736	5566.86	48.8217	−53	67.25	67.06	− 7	5566.99
1	D	36.8023	5570.82	48.8835	−53	70.67	70.75	− 8	5570.67
1	B	....	....	48.9165	−53	72.50	72.50	− 8	5572.42
1	n D	....	....	48.9489	−53	74.30	74.30	− 9	5574.21
8–9	D	36.5648	5584.07	49.1271	−53	84.24	84.16	−11	5584.05
5–6	B	36.5066	5587.33	49.1821	−53	87.33	87.33	−12	5587.21
1	D	....	....	49.2191	−53	89.40	89.40	−12	5589.28
1	B	36.4203	5592.20	49.2823	−53	92.96	92.58	−13	5592.45
1	n D	....	....	49.3260	−53	95.43	95.43	−14	5595.29
4	B	36.3247	5597.61	49.3721	−53	98.04	97.83	−14	5597.69
1	n D	36.2836	5599.94	49.4118	−53	00.29	00.12	−15	5599.97
1–2	n D	36.1205	5609.23	49.5859	−53	10.20	09.72	−17	5609.55
0–1	D	36.0020	5616.03	49.6885	−53	16.07	16.05	−18	5615.87
2	B	35.9730	5617.70	49.7208	−53	17.93	17.82	−18	5617.64
1	n D	35.9290	5620.24	49.7598	−53	20.17	20.21	−19	5620.02
2	n D	35.8487	5624.87	49.8462	−54	25.15	25.01	−20	5624.81
2	B	35.7903	5627.26	49.9022	−54	28.39	27.83	−21	5627.62
2	B	35.7484	5630.70	49.9456	−54	30.91	30.81	−21	5630.60
10	D	35.6890	5634.16	50.0033	−54	34.26	34.21	−21	5634.00
...	Head	35.6562	5636.07	50.0416	−54	36.49	36.28	−23	5636.05
6	B	35.6326	5637.45	50.0673	−54	37.99	37.72	−23	5637.49
6	B	35.5672	5641.29	50.1241	−54	41.31	41.30	−24	5641.06
1	D	35.5218	5643.95	50.1686	−54	43.92	43.94	−25	5643.69
3	n B	35.4712	5646.93	50.2250	−54	47.23	47.08	−25	5646.83
0–1	D	35.4149	5650.25	....	−54	.....	50.25	−25	5650.00
8	B	35.3360	5654.93	50.3578	−54	55.07	55.00	−26	5654.74
1	D	35.2609	5659.39	50.4264	−54	59.13	59.28	−27	5659.01
1–2	D	35.0569	5671.68	50.6441	−54	72.11	71.90	−30	5671.60
2–3	B	35.0141	5674.16	50.6803	−54	74.28	74.22	−30	5673.92
1–2	D	34.9730	5676.63	50.7203	−54	76.69	76.66	−31	5676.35
1	B	34.9259	5679.48	50.7638	−54	79.31	79.40	−31	5679.09
1	B	34.8330	5685.10	50.8493	−54	84.47	84.79	−31	5684.48
4	wn B	34.6899	5693.82	51.0091	−54	94.17	94.00	−33	5693.67
0–1	D	34.6358	5697.13	51.0672	−54	97.72	97.43	−33	5697.10
3	B	34.4907	5706.05	51.1990	−54	05.80	05.93	−35	5705.58
2	D	34.4483	5708.66	51.2438	−54	08.55	08.61	−35	5708.26
2	B	34.4073	5711.20	51.2838	−54	11.02	11.11	−35	5710.76
1	D	34.3754	5713.18	51.3171	−54	13.07	13.13	−36	5712.77
1	B	34.3453	5715.05	51.3577	−54	15.58	15.32	−36	5714.96
2	B	34.2939	5718.24	51.3960	−54	17.96	18.10	−36	5717.74
4	B	34.1903	5724.71	51.5036	−54	24.65	24.68	−37	5724.31
3	D	34.0749	5731.94	51.6266	−54	32.34	32.14	−37	5731.77
2	n D	33.8804	5744.23	51.8313	−55	45.23	44.73	−39	5744.34
1	n B	....	....	51.8584	−55	46.95	46.95	−39	5746.56
1	n D	33.7952	5749.64	51.8955	−55	49.30	49.47	−39	5749.08
3	n B	33.6737	5757.41	52.0189	−55	57.16	57.29	−40	5756.89
2	n D	33.5835	5763.21	52.0912	−55	61.78	62.50	−40	5762.10
3	wn B	33.5161	5767.55	52.1736	−55	67.07	67.31	−41	5766.90
1	n B	33.3802	5776.36	52.3036	−55	75.46	75.91	−42	5775.49
1	n D	....	....	52.3455	−55	78.18	78.18	−42	5777.76

19 *PISCIUM*=273 *SCHJELLERUP.* PLATE G 269—*Continued*

Intensity	Character	Red Right: Mean Scale Reading	Red Right: Wave-Length Reduced to Sun	Red Left: Mean Scale Reading	Red Left: Red. to Sun	Red Left: Wave-Length Red. to Sun	Mean Wave-Length: Uncor-rected	Mean Wave-Length: Cor. from Curve	Mean Wave-Length: Corrected
		mm.	t.m.	mm.		t.m.	t.m.		t.m.
1-2	B	33.3122	5780.79	52.3798	−55	80.40	80.60	−42	5780.18
3	n D	33.2371	5785.70	52.4564	−55	85.39	85.55	−42	5785.13
1-2	D	33.0335	5799.10	....	−55	.....	99.10	−44	5798.66
1	n D	....	....	53.0274	−55	23.13	23.13	−44	5822.69

19 *PISCIUM*=273 *SCHJELLERUP.* PLATE G 293

1899, January 27, G. M. T. 13ʰ.0. Hour angle, W 3ʰ.9. Star good ; comparison good.

		mm.	t. m.	mm.		t.m.	t.m.		t.m.
1-2	wn D	44.3276	5173.18	43.8093	−40	73.51	73.35	+13	5173.48
2	n D	44.0579	5183.83	44.0609	−40	83.46	83.65	+12	5183.77
1	n D	43.9335	5188.78	....	−40	.....	88.78	+11	5188.89
1-2	B	43.8898	5190.52	44.2470	−40	90.88	90.70	+11	5190.81
2	n D	43.8346	5192.73	44.2902	−40	92.61	92.67	+10	5192.77
2	n B	43.7226	5197.22	44.3986	−40	96.96	97.09	+10	5197.19
2	n B	43.3026	5214.24	44.8348	−40	14.66	14.45	+ 9	5214.54
1	n D	43.2445	5216.61	44.8875	−40	16.81	16.71	+ 7	5216.78
1	B	43.2021	5218.35	44.9238	−40	18.30	18.33	+ 7	5218.40
1	n D	43.0283	5225.50	....	−40	.....	25.50	+ 5	5225.55
1-2	D	42.8259	5233.88	45.3063	−40	34.11	34.00	+ 4	5234.04
1	D	42.6896	5239.56	45.4421	−40	39.78	39.67	+ 3	5239.70
1-2	B	42.5729	5244.45	45.5789	−40	45.52	44.99	+ 1	5245.00
4	D	42.5058	5247.28	45.6200	−40	47.25	47.27	0	5247.27
1	B	42.4700	5248.78	45.6770	−40	49.66	49.22	0	5249.22
3	D	42.4172	5251.01	45.7135	−40	51.20	51.11	0	5251.11
1	D	42.3108	5255.51	45.8297	−40	56.12	55.82	− 1	5255.81
7	n D	41.9689	5270.10	46.1627	−41	70.35	70.23	− 3	5270.20
2-3	n B	41.7429	5279.85	46.3930	−41	80.30	80.08	− 5	5280.03
1-2	D	41.6892	5282.19	46.4431	−41	82.48	82.34	− 5	5282.29
3	D	41.3253	5298.11	46.8156	−41	98.80	98.46	− 5	5298.41
1	n D	41.2195	5302.78	46.9097	−41	02.96	02.87	− 5	5302.82
1-2	B	41.1673	5306.09	46.9693	−41	05.60	05.85	− 5	5305.80
2	n B	40.9915	5312.92	47.1470	−41	13.52	13.22	− 5	5313.17
3	n D	40.9380	5315.31	47.1947	−41	15.66	15.49	− 5	5315.44
4	n B	40.8838	5317.74	47.2398	−41	17.68	17.71	− 5	5317.66
2	n D	40.8139	5320.88	47.3166	−41	21.13	21.00	− 5	5320.95
1	n D	....	....	47.4102	−41	25.35	25.35	− 4	5325.31
2-3	D	40.6414	5328.66	47.4889	−41	28.91	28.79	− 3	5328.76
1-2	B	40.4101	5339.18	47.7265	−41	39.73	39.46	− 1	5339.45
4	D	40.3725	5340.90	47.7637	−41	41.43	41.17	0	5341.17
3	D	40.1804	5349.73	47.9589	−41	50.41	50.07	+ 1	5350.08
2	wn B	....	....	48.0083	−41	52.69	52.69	+ 1	5352.70
2	B	39.7770	5368.49	48.3496	−41	68.59	68.54	+ 5	5368.59
9	w D	39.7130	5371.49	48.4172	−41	71.77	71.63	+ 6	5371.69
5-6	wn B	39.6435	5376.76	48.4854	−41	74.98	75.87	+ 6	5375.93
2	wn D	39.5873	5377.40	48.5423	−42	77.65	77.53	+ 7	5377.60
4	wn B	39.5398	5379.65	48.5990	−42	80.35	80.00	+ 8	5380.08
1	D	39.3157	5390.31	48.8188	−42	90.80	90.56	+ 9	5390.65
1	D	39.1702	5397.28	48.9671	−42	97.91	97.60	+10	5397.70
1-2	D	38.9884	5406.06	49.1493	−42	06.71	06.39	+10	5406.49
2-3	D	38.8985	5410.42	49.2266	−42	10.46	10.44	+11	5410.55
1-2	B	38.8655	5412.02	49.2717	−42	12.65	12.39	+11	5412.50
1	D	38.8309	5413.70	49.3012	−42	14.09	13.90	+11	5414.01
7	B	38.7718	5416.59	49.3638	−42	17.14	16.87	+11	5416.98
2	n D	38.7113	5419.55	49.4215	−42	19.97	19.76	+11	5419.87
4	n B	38.6454	5422.78	49.4905	−42	23.34	23.06	+12	5423.18
1	D	....	....	49.5234	−42	24.97	24.97	+12	5425.09
2-3	B	38.5594	5427.01	49.5875	−42	28.13	27.57	+12	5427.69
3	D	38.4954	5430.17	49.6291	−42	30.18	30.18	+12	5430.30
2	B	38.4608	5431.89	49.6715	−42	32.28	32.09	+12	5432.21
1	D	38.4253	5433.64	49.7054	−42	33.96	33.80	+12	5433.92
1	n D	38.3272	5438.52	49.8043	−42	38.87	38.70	+12	5438.82
1	n B	38.2020	5444.77	49.9298	−42	45.14	44.96	+11	5445.07
10	D	38.1415	5447.79	49.9861	−42	47.96	47.88	+11	5447.99

19 *PISCIUM* = 273 *SCHJELLERUP.* PLATE G 293—*Continued*

Intensity	Character	Red Right		Red Left			Mean Wave-Length		
		Mean Scale Reading	Wave-Length Reduced to Sun	Mean Scale Reading	Red. to Sun	Wave-Length Red. to Sun	Uncor-rected	Cor. from Curve	Corrected
		mm.	t.m.	mm.		t.m.	t.m.		t.m.
2	B	38.0655	5450.60	50.0365	-42	50.49	50.55	+10	5450.65
2-3	B	38.0313	5453.34	50.1014	-42	53.76	53.55	+10	5453.65
3-4	D	37.9668	5456.59	50.1614	-42	56.78	56.69	+10	5456.79
2	B	37.9252	5458.69	50.2067	-42	59.08	58.87	+10	5458.97
2	D	37.8887	5460.54	50.2453	-42	61.03	60.79	+10	5460.89
1-2	B	37.8473	5462.64	50.2819	-42	62.89	62.67	+10	5462.77
1	D	....	....	50.3803	-42	67.90	67.90	+ 9	5467.99
3	wn B	37.6671	5471.83	50.4713	-42	72.54	72.19	+ 8	5472.27
1-2	D	37.6181	5474.34	50.5081	-42	74.43	74.39	+ 8	5474.47
1	B	....	....	50.6344	-42	80.92	80.92	+ 7	5480.99
2	D	37.4621	5482.37	50.6697	-42	82.75	82.56	+ 7	5482.63
2	B	37.2032	5495.80	50.9215	-43	95.79	95.80	+ 5	5495.85
4-5	D	37.1634	5497.88	50.9682	-43	98.27	98.08	+ 5	5498.13
1	D	37.0861	5501.93	51.0444	-43	02.23	02.08	+ 4	5502.12
1	D	36.9948	5506.72	51.1359	-43	07.04	06.89	+ 3	5506.92
3	B	36.9370	5509.77	51.1910	-43	09.94	09.86	+ 3	5509.89
1-2	n D	36.8839	5512.58	51.2400	-43	12.53	12.56	+ 1	5512.57
0-1	D	36.6695	5523.98	51.4623	-43	24.35	24.17	- 1	5524.16
2	B	36.5224	5531.86	....	-43	.....	31.86	- 3	5531.83
1-2	D	36.4876	5533.73	....	-43	.....	33.73	- 3	5533.70
10	D	36.3832	5539.37	51.7470	-43	39.64	39.51	- 5	5539.46
2-3	B	36.3061	5543.54	51.8141	-43	43.27	43.41	- 6	5543.35
1	D	36.2272	5547.83	51.9171	-43	48.87	48.35	- 7	5548.28
1	D	36.1444	5552.35	51.9874	-43	52.71	52.53	- 8	5552.45
2	B	36.1144	5553.99	52.0148	-43	54.20	54.10	- 9	5554.01
1	D	36.0761	5556.09	52.0584	-43	56.59	56.34	- 9	5556.25
1	B	36.0396	5558.09	52.0899	-43	58.32	58.21	- 9	5558.12
1	D	35.9639	5562.25	52.1680	-43	62.60	62.43	-11	5562.32
2	B	35.9218	5564.57	52.2075	-43	64.79	64.68	-11	5564.57
1-2	D	35.8853	5566.59	52.2483	-43	67.04	66.82	-12	5566.70
1	D	35.8228	5570.08	52.3015	-43	69.98	70.03	-12	5569.91
1	B	35.7926	5571.72	52.3337	-43	71.76	71.74	-13	5571.61
1	D	35.7671	5573.14	52.3654	-43	73.52	73.33	-13	5573.20
1	D	35.7058	5576.55	52.4213	-43	76.63	76.59	-14	5576.45
1	B	35.6281	5580.89	52.4934	-43	80.65	80.77	-15	5580.62
10	D	35.5743	5583.90	52.5574	-43	84.23	84.07	-16	5583.91
4-5	B	35.5167	5587.13	52.6070	-43	87.01	87.07	-17	5586.90
1	D	35.4781	5589.30	52.6475	-43	89.29	89.30	-17	5589.13
2	B	35.4241	5592.32	52.6989	-43	92.18	92.25	-18	5592.07
1	D	35.3945	5594.01	52.7466	-43	94.87	94.44	-18	5594.26
3-4	B	35.3327	5597.51	52.7963	-43	97.68	97.60	-19	5597.41
1	D	35.2937	5599.72	52.8369	-43	99.98	99.85	-19	5599.66
1	D	35.1307	5609.00	53.0030	-43	09.44	09.22	-20	5609.02
0-1	D	35.0075	5616.06	53.1101	-44	15.56	15.81	-21	5615.60
2-3	n D	34.9350	5620.23	53.1898	-44	20.14	20.19	-22	5619.97
2	D	34.8480	5625.26	53.2680	-44	24.65	24.97	-23	5624.74
1	B	34.7991	5628.09	53.3223	-44	27.79	27.94	-23	5627.71
1-2	B	34.7494	5630.98	53.3754	-44	30.88	30.93	-23	5630.70
10	D	34.6859	5634.68	53.4411	-44	34.70	34.69	-23	5634.46
..	Head	34.6529	5636.60	53.4736	-44	36.59	36.60	-24	5636.36
3	B	34.6305	5637.91	53.4898	-44	37.53	37.72	-24	5637.48
2-3	B	34.5708	5641.41	53.5593	-44	41.60	41.51	-25	5641.26
1	D	34.5285	5643.89	53.5987	-44	43.91	43.90	-25	5643.65
1	n B	....	....	53.6574	-44	47.36	47.36	-25	5647.11
1	n D	34.4224	5650.13	53.7002	-44	49.88	50.01	-25	5649.76
1	B	34.3840	5652.40	53.7427	-44	52.38	52.39	-26	5652.13
1	B	34.3380	5655.13	53.7950	-44	55.50	55.28	-26	5655.02
1-2	D	34.2732	5658.97	53.8547	-44	59.02	59.00	-27	5658.73
3	B	34.0156	5674.37	54.1068	-44	74.06	74.22	-28	5673.94
1	n D	33.9817	5676.41	54.1516	-44	76.76	76.59	-28	5676.31
1	B	33.9293	5679.57	54.2020	-44	79.79	79.68	-29	5679.39
1	B	33.8439	5684.73	54.2866	-44	84.90	84.82	-30	5684.52
1	n D	33.7948	5687.71	54.3396	-44	88 11	87.91	-30	5687.61
3-4	B	33.6891	5694.15	54.4430	-44	94.40	94.28	-30	5693.98
1-2	D	33.6425	5696.99	54.4863	-44	97.04	97.02	-30	5696.72
3	B	33.5005	5705.71	54.6349	-44	06.15	05.93	-31	5705.62
2	n D	33.4497	5708.84	54.6791	-44	08.87	08.86	-31	5708.55
2	B	33.4126	5711.13	54.7160	-44	11.15	11.14	-31	5710.83

19 *PISCIUM* = 273 *SCHJELLERUP*. PLATE G 293 – *Continued*

INTENSITY	CHARACTER	RED RIGHT		RED LEFT			MEAN WAVE-LENGTH		
		Mean Scale Reading	Wave-Length Reduced to Sun	Mean Scale Reading	Red. to Sun	Wave-Length Red. to Sun	Uncorrected	Cor. from Curve	Corrected
		mm.	t.m.	mm.		t.m.	t.m.		t.m.
1	D	33.3742	5713.51	54.7594	– 44	13.83	13.67	– 32	5713.35
5	w B	33.3120	5717.37	54.8116	– 44	17.07	17.22	– 32	5716.90
1	n D	33.2490	5721.27	54.8796	– 44	21.29	21.28	– 33	5720.95
2	B	33.1980	5724.47	54.9301	– 44	24.44	24.46	– 33	5724.13
3	n D	33.0843	5731.58	55.0491	– 45	31.87	31.73	– 33	5731.40
1	n D	32.8723	5744.96	55.2605	– 45	45.19	45.08	– 33	5744.75
1	n B	32.8321	5747.51	55.2967	– 45	47.48	47.50	– 35	5747.15
1	n D	32.7885	5750.28	55.3435	– 45	50.45	50.37	– 35	5750 02
2-3	wn B	32.6799	5757.22	55.4555	– 45	57.59	57.41	– 35	5757.06
1	n D	32.5897	5763.00	55.5380	– 45	62.87	62.94	– 35	5762.59
1-2	wn B	32.5096	5768.16	55.6138	– 45	67.75	67.96	– 36	5767.60
1	n D	32.4652	5771.03	55.6664	– 45	71.14	71.09	– 36	5770.73
1	n B	32.3870	5776.09	55.7438	– 45	76.79	76.44	– 36	5776.08
1	n D	32.3565	5778.07	55.7760	– 45	78.23	78.15	– 36	5777.79
1	n B	32.3219	5780.33	55.8012	– 45	79.87	80.10	– 37	5779.73
1	n D	32.0366	5799.02	56.0927	– 45	98.93	98.98	– 37	5798.61

19 *PISCIUM* = 273 *SCHJELLERUP*. PLATE G 357

1899, December 19, G.M.T. 12h.8. Hour angle, W. 1h.2. Star excellent; comparison excellent.

INTENSITY	CHARACTER	RED RIGHT		RED LEFT		MEAN WAVE-LENGTH		
		Mean Scale Reading	Wave-Length Reduced to Sun	Mean Scale Reading	Wave-Length Reduced to Sun	Uncorrected	Cor. from Curve	Corrected
		mm.	t.m.	mm.	t.m.	t.m.		t.m.
1	n D	36.5909	5168.82	47.9644	5168.97	68.90	–33	5168.57
2-3	n D	36.4711	5173.68	48.0796	5173.92	73.80	–32	5173.48
1	B	36.1344	5187.46	....	....	87.46	–27	5187.19
1-2	n D	36.0903	5189.28	48.4589	5189.16	89.22	–27	5188.95
4	n D	35.9849	5193.64	48.5632	5193.47	93.56	–25	5193.31
1	n B	35.8963	5197.32	48.6570	5197.36	97.34	–24	5197.10
10	n D	35.6360	5208.18	48.9230	5208.40	08.29	–20	5208.09
6	wn D	35.2121	5226.14	49.3305	5225.73	25.94	–14	5225.80
3	n D	35.0231	5234.24	49.5258	5234.08	34.16	–12	5234.04
2-3	wn B	34.9654	5236.73	49.5935	5236.99	36.86	–11	5236.75
1-2	nn D	34.8983	5239.62	49.6537	5239.67	39.65	–10	5239.55
5	D	34.7153	5247.56	49.8388	5247.61	47.59	– 6	5247.53
5-6	D	34.6308	5251.25	49.9220	5251.24	51.25	– 5	5251.20
4	D	34.1920	5270.58	50.3631	5270.67	70.63	– 1	5270.62
1	n B	33.9922	5279.50	50.5654	5279.69	79.60	0	5279.60
2	wn D	33.9076	5283.29	50.6377	5282.93	83.11	+ 1	5283.12
5	n D	33.5840	5297.94	50.9641	5297.69	97.82	+ 4	5297.86
2	n D	33.4820	5302.59	51.0712	5302.58	02.59	+ 5	5302.64
1-2	n B	33.4323	5304.87	51.1280	5305.18	05.03	+ 5	5305.08
2	n B	33.2535	5313.14	51.3014	5313.15	13.15	+ 6	5313.21
3	n D	33.2049	5315.34	51.3428	5315.07	15.21	+ 6	5315.27
3	n B	33.1548	5317.66	51.3978	5317.61	17.64	+ 8	5317.72
2	n D	33.0797	5321.14	51.4715	5321.03	21.09	+ 9	5321.18
1	n D	32.9979	5324.95	51.5611	5325.20	25.08	+10	5325.18
2	n D	32.9185	5328.66	51.6419	5328.98	28.82	+11	5328.93
1-2	D	32.7434	5336.89	51.8044	5336.66	36.78	+12	5336.90
2-3	n B	32.6976	5339.05	51.8536	5338.93	38.99	+12	5339.11
2	n D	32.6539	5341.12	51.8987	5341.06	41.09	+13	5341.22
4	n D	32.4716	5349.77	52.0750	5349.43	49.60	+13	5349.73
1	n B	32.4235	5352.07	52.1396	5352.51	52.29	+14	5352.43
1-2	n D	32.2084	5362.39	52.3518	5362.69	62.54	+15	5362.69
1	D	32.1267	5366.33	52.4321	5366.57	66.45	+16	5366.61
8	D	32.0281	5371.11	52.5245	5371.05	71.08	+17	5371.25
5	B	31.9549	5374.67	52.6028	5374.85	74.76	+17	5374.93
2	D	31.9047	5377.12	52.6504	5377.17	77.15	+17	5377.32
3	n B	31.8543	5379.58	52.7000	5379.60	79.59	+18	5379.77
1	nn D	31.6310	5390.55	52.9236	5390.58	90.57	+19	5390.76
4	D	31.4985	5397.11	53.0572	5397.20	97.16	+19	5397.35
1	D	31.3236	5405.83	53.2310	5405.86	05.85	+20	5406.05

19 *PISCIUM*=273 *SCHJELLERUP*. PLATE G 357—*Continued*

Intensity	Character	Red Right		Red Left		Mean Wave-Length		
		Mean Scale Reading	Wave-Length Reduced to Sun	Mean Scale Reading	Wave-Length Reduced to Sun	Uncorrected	Cor. from Curve	Corrected
		mm.	t.m.	mm.	t.m.	t.m.		t.m.
4	D	31.2489	5409.57	53.3114	5409.88	09.73	+21	5409.94
1	D	31.1592	5414.07	53.3920	5413.93	14.00	+21	5414.21
6–7	B	31.1020	5416.96	53.4507	5416.90	16.93	+21	5417.14
2–3	n D	31.0479	5419.70	53.5050	5419.64	19.67	+22	5419.89
2–3	B	30.9895	5422.65	53.5654	5422.70	22.68	+22	5422.90
1	D	30.9545	5424.43	53.6026	5424.59	24.51	+22	5424.73
3	D	30.8475	5429.88	53.7055	5429.83	29.86	+22	5430.08
2	D	30.7724	5433.72	53.7791	5433.59	33.66	+22	5433.88
2	D	30.6796	5438.48	53.8684	5438.17	38.33	+22	5438.55
2	B	....	....	53.9894	5444.41	44.41	+22	5444.63
5–6	D	30.4977	5447.87	54.0422	5447.14	47.51	+22	5447.73
1–2	B	30.4435	5450.68	54.1060	5450.44	50.56	+23	5450.79
2	B	30.3931	5453.30	54.1616	5452.52	52.91	+23	5453.14
4	D	30.3307	5456.55	54.2207	5456.41	56.48	+23	5456.71
1	B	30.2931	5458.51	54.2603	5458.48	58.50	+23	5458.73
2	D	30.2570	5460.40	54.2961	5460.35	60.38	+23	5460.61
1–2	B	30.2112	5462.80	54.3419	5462.76	62.78	+23	5463.01
1–2	B	30.1771	5464.59	54.3765	5464.57	64.58	+23	5464.81
2	D	30.1373	5466.69	54.4163	5466.66	66.67	+23	5466.90
2	B	30.0390	5471.87	54.5152	5471.88	71.88	+23	5472.11
2	n D	29.9979	5474.04	54.5564	5474.06	74.05	+23	5474.28
2	n D	29.9280	5477.75	54.6266	5477.78	77.77	+23	5478.00
2–3	D	29.8442	5482.20	54.7100	5482.22	82.21	+23	5482.44
3	D	29.5614	5497.38	54.9963	5497.58	97.48	+23	5497.71
2	D	29.4792	5501.82	55.0732	5501.74	01.78	+23	5502.01
1	D	29.3828	5507.05	55.1692	5506.95	07.00	+23	5507.23
1–2	n D	29.2880	5512.22	55.2618	5511.99	12.11	+23	5512.34
1	n D	29.0767	5523.82	55.4749	5523.69	23.76	+23	5523.99
1–2	n D	29.0086	5527.58	55.5492	5527.79	27.69	+23	5527.92
2	n B	28.9425	5531.24	55.6192	5531.67	31.46	+22	5531.68
1	D	28.9077	5533.17	55.6468	5533.21	33.19	+22	5533.41
7	D	28.7985	5539.25	55.7660	5539.65	39.45	+22	5539.67
2	n D	28.6479	5547.69	55.9165	5548.28	47.99	+21	5548.20
1	n D	28.5716	5551.98	55.9824	5552.00	51.98	+21	5552.19
3	B	28.5389	5553.83	56.0157	5553.88	53.86	+20	5554.06
1–2	D	28.5065	5555.66	56.0508	5555.86	55.76	+20	5555.96
2	D	28.3946	5562.00	56.1618	5562.16	62.08	+20	5562.28
2	B	28.3622	5563.85	56.1950	5564.05	63.95	+20	5564.15
2	D	28.3225	5566.11	56.2297	5566.02	66.07	+20	5566.27
1	D	28.2556	5569.93	56.2996	5570.01	69.97	+20	5570.17
1	B	28.2357	5571.07	56.3232	5571.37	71.22	+19	5571.41
1	D	28.2064	5572.75	56.3553	5573.21	72.98	+19	5573.17
1	D	28.1550	5575.70	56.4049	5576.06	75.88	+19	5576.07
8	D	28.0143	5583.81	56.5377	5583.72	83.77	+18	5583.95
4	B	27.9691	5586.43	56.5891	5586.70	86.57	+18	5586.75
2	n D	27.9385	5588.20	56.6212	5588.56	88.38	+18	5588.56
1–2	B	27.8771	5591.77	56.6850	5592.27	92.02	+16	5592.18
1–2	n D	27.8519	5593.24	56.7174	5594.16	93.70	+16	5593.86
1–2	B	27.7870	5597.03	56.7644	5596.90	96.97	+16	5597.13
1	n D	27.7582	5598.71	56.8030	5599.10	98.91	+14	5599.05
3	n D	27.5787	5609.26	56.9777	5609.43	09.35	+13	5609.48
1	n D	27.4832	5614.91	57.0721	5615.02	14.97	+12	5615.09
3–4	n D	27.3989	5619.91	57.1574	5620.08	20.00	+10	5620.10
4–5	n D	27.3243	5624.36	57.2314	5624.50	24.43	+ 9	5624.52
10	D	27.1626	5634.05	57.3846	5633.65	33.85	+ 7	5633.92
....	Head	27.1260	5636.23	57.4310	5636.40	36.32	+ 7	5636.39
1	B	27.1109	5637.16	57.4475	5638.07	37.62	+ 7	5637.69
1–2	B	27.0499	5640.84	57.5064	5641.03	40.94	+ 7	5641.01
1	n D	26.9853	5644.75	57.5663	5644.66	44.71	+ 4	5644.75
1	n B	26.9614	5646.20	57.5912	5646.17	46.19	+ 4	5646.23
1	D	26.9033	5649.74	....	....	49.74	+ 3	5649.77
1	B	26.8662	5652.00	57.6893	5652.14	52.07	+ 3	5652.10
2	B	26.8165	5655.03	57.7445	5655.51	55.27	+ 2	5655.29
3	n D	26.7738	5657.64	57.7881	5658.18	57.91	+ 2	5657.93
2	D	26.5594	5670.84	57.9960	5670.99	70.92	+ 1	5670.93
3	B	26.5217	5673.18	58.0379	5673.59	73.39	– 4	5673.35
2–3	D	26.4767	5675.97	58.0800	5676.20	76.09	– 4	5676.05
1–2	B	26.4304	5678.84	58.1298	5679.30	79.07	– 5	5679.02

19 *PISCIUM*=273 *SCHJELLERUP*. PLATE G 357—*Continued*

Intensity	Character	Red Right: Mean Scale Reading	Red Right: Wave-Length Reduced to Sun	Red Left: Mean Scale Reading	Red Left: Wave-Length Reduced to Sun	Mean Wave-Length: Uncor-rected	Mean Wave-Length: Cor. from Curve	Mean Wave-Length: Corrected
		mm.	t.m.	mm.	t.m.	t.m.		t.m.
1	B	26.3504	5683.47	58.2076	5684.15	83.81	− 6	5683.75
4–5	n B	26.1981	5693.39	58.3626	5693.88	93.64	− 7	5693.57
2	n D	26.1487	5696.50	58.4069	5696.68	96.59	−10	5696.49
3	B	26.0122	5705.14	58.5441	5705.37	05.26	−13	5705.13
2–3	D	25.9681	5707.94	58.5862	5708.05	08.00	−16	5707.84
1–2	B	25.9312	5710.29	58.6267	5710.63	10.46	−16	5710.30
1–2	D	25.8981	5712.40	58.6644	5713.08	12.74	−17	5712.57
3	B	25.8323	5716.61	58.7269	5717.09	17.45	−18	5717.27
2	D	25.7591	5721.31	58.7931	5721.29	21.30	−18	5721.12
2	B	25.7211	5723.75	58.8383	5724.20	23.98	−18	5723.80
1–2	n D	....	....	58.9537	5731.65	31.65	−21	5731.44
3	n D	25.4132	5743.73	59.1507	5744.48	44.11	−26	5743.85
2–3	n D	25.1178	5763.17	59.4328	5763.07	63.12	−33	5762.79
4	n D	24.9911	5771.59	59.5667	5771.98	71.79	−35	5771.44
1	B	24.9298	5775.69	59.6340	5776.48	76.09	−35	5775.74
1	D	24.8977	5777.84	59.6633	5778.45	78.15	−37	5777.78
1	B	24.8696	5779.72	59.6891	5780.18	79.95	−40	5779.55
1–2	D	24.5942	5798.32	59.9630	5798.70	98.56	−50	5778.06
1	D	24.2375	5822.81	60.3219	5823.36	23.09	−40	5822.69

19 *PISCIUM*=273 *SCHJELLERUP*

Means of Two Plates

Plate G 264: Intensity	Plate G 264: Character	Plate G 264: Wave-Length	Plate G 343: Intensity	Plate G 343: Character	Plate G 343: Wave-Length	Mean Wave-Length: Uncorrected for Velocity	Mean Wave-Length: Cor. for V	Mean Wave-Length: Corrected for Velocity
		t.m.			t.m.	t.m.		t.m.
1	D	4375.87	...	....	....	75.81	+3	4375.84
10	w D	4384.11	...	....	....	84.05	+3	4384.08
2–3	n D	4390.36	...	....	....	90.30	+3	4390.33
5	wn D	4395.05	8	w D	4394.55	94.80	+3	4394.83
...	....	....	1	D	4397.56	97.62	+3	4397.65
1	n D	4401.16	3	D	4400.51	00.84	+3	4400.87
3	B	4402.50	...	....	....	02.44	+3	4402.47
10	w D	4405.02	4	D	4404.88	04.95	+3	4404.98
2	D	4408.66	4	D	4408.30	08.48	+3	4408.51
...	....	....	1	D	4412.20	12.26	+3	4412.29
4–5	nn D	4415.28	2	wn D	4414.99	15.14	+3	4415.17
...	....	....	2–3	wn D	4420.51	20.57	+3	4420.60
1	D	4423.22	1–2	D	4422.85	23.04	+3	4423.07
1	B	4426.84	...	....	....	26.78	+3	4426.81
2	n D	4427.70	1–2	D	4427.21	27.46	+3	4427.49
3	n D	4430.28	1–2	n D	4430.01	30.15	+3	4430.18
6–7	wn D	4435.71	3	n D	4435.27	35.49	+3	4435.52
1	D	4438.25	1	n D	4437.94	38.10	+3	4438.13
...	....	....	2	B	4438.80	38.86	+3	4438.89
...	....	....	2–3	n D	4444.36	44.42	+3	4444.45
1–2	n D	4447.26	1	n D	4446.96	47.11	+3	4447.14
3	n B	4448.80	2	n B	4448.49	48.65	+3	4448.68
4–5	n D	4450.15	5	n D	4449.70	49.93	+3	4449.96
...	....	....	1	D	4453.17	53.23	+3	4453.26
2	n D	4455.41	3	n D	4455.05	55.23	+3	4455.26
3–4	n D	4462.24	2	n D	4462.04	62.14	+3	4462.17
4	wn B	4463.99	3	w B	4464.02	64.01	+3	4464.04
1	n D	4465.39	1	D	4465.13	65.26	+3	4465.29
1	n D	4469.12	1–2	D	4468.62	68.92	+3	4468.95
...	....	....	1	D	4472.16	72.22	+3	4472.25
...	....	....	1–2	n D	4475.43	75.49	+3	4475.52

19 *PISCIUM* = 273 *SCHJELLERUP—Continued*

Plate G 264			Plate G 343			Mean Wave-Length		
Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		t.m.			t.m.	t.m.		t.m.
1-2	n D	4479.97	1-2	n D	4479.96	79.97	+3	4480.00
2	D	4482.09	3	n D	4482.23	82.16	+3	4482.19
3	B	4483.80	2	n B	4483.38	83.59	+3	4483.62
2	B	4486.06	...	....	....	86.00	+3	4486.03
1-2	D	4487.60	1-2	n D	4487.47	87.54	+3	4487.57
3	B	4488.64	...	....	....	88.58	+3	4488.61
2-3	D	4489.75	2-3	D	4489.68	89.72	+3	4489.75
6	D	4497.13	3	n D	4496.85	96.99	+3	4497.02
2 3	D	4501.77	5	n D	4501.72	01.75	+3	4501.78
6	n D	4506.78	6-7	D	4506.70	06.74	+3	4506.77
1	D	4509.64	1	D	4509.83	09.74	+3	4509.77
...	wn D	4512.87	...	wn D	4512.58	12.73	+3	4512.76
2	n B	4517.08	...	....	....	17.02	+3	4517.05
4	D	4518.28	3	D	4518.20	18.24	+3	4518.27
1	D	4520.57	...	....	....	20.51	+3	4520.54
3-4	B	4521.69	...	....	....	21.63	+3	4521.66
5	D	4523.00	3	D	4522.93	22.97	+3	4523.00
6	w D	4527.44	4	nn D	4527.07	27.26	+3	4527.29
2-3	n D	4531.38	2	D	4531.26	31.32	+3	4531.35
3-4	wn D	4535.87	9	wn D	4535.40	35.64	+3	4535.67
3	B	4537.40	3	n B	4537.18	37.29	+3	4537.32
3	B	4539.00	2	B	4538.94	38.97	+3	4539.00
3	D	4540.51	1	D	4540.26	40.39	+3	4540.42
1	D	4542.78	...	....	....	42.72	+3	4542.75
2	B	4544.13	...	....	....	44.07	+3	4544.10
3	n B	4547.82	...	....	....	47.76	+3	4547.79
5	wn D	4549.23	5	wn D	4549.21	49.22	+3	4549.24
10	w D	4553.57	...	w D	4553.45	53.51	+3	4553.54
Limits {		4551.98	...	....	....	51.92	+3	4552.0
		4554.81	...	....	....	54.75	+3	4554.8
3	D	4560.31	3	nn D	4560.40	60.36	+3	4560.39
3	n B	4561.94	...	....	....	61.88	+3	4561.91
2-3	D	4563.62	2-3	D	4563.02	63.32	+3	4563.35
1	D	4565.62	1-2	n D	4565.77	65.70	+3	4565.73
...	w D	4571.69	9	w D	4571.57	71.63	+3	4571.66
...	....	....	3	n D	4575.16	75.22	+3	4575.25
...	....	....	3-4	n D	4577.48	77.54	+3	4577.57
...	....	....	...	Head	4578.0	78.1	+3	4578.1
...	....	....	1	D	4580.33	80.39	+3	4580.42
...	....	....	1	D	4581.84	81.90	+3	4581.93
2	n B	4583.70	...	....	....	83.64	+3	4583.67
1	D	4584.68	1-2	D	4584.39	84.54	+3	4584.57
1	B	4585.44	...	....	....	85.38	+3	4585.41
2	n D	4586.37	2	n D	4586.28	86.34	+3	4586.37
1	D	4590.99	1	n D	4590.98	90.99	+3	4591.02
2-3	n D	4594.39	2	n D	4594.23	94.31	+3	4594.34
2	n B	4595.83	...	....	....	95.77	+3	4595.80
...	....	....	1	n D	4597.43	97.49	+3	4597.52
1	D	4600.90	2	n D	4600.72	00.81	+3	4600.84
10	w D	4606.99	8	wn D	4606.66	06.83	+3	4606.86
...	....	....	1	n D	4609.98	10.04	+3	4610.07
1-2	B	4612.35	...	....	....	12.29	+3	4612.32
1	n D	4613.74	1-2	nn D	4613.79	13.77	+3	4613.80
3	B	4615.01	3	B	4614.86	14.92	+3	4614.95
2	D	4616.39	3	D	4616.13	16.26	+3	4616.29
6	B	4617.84	6	B	4317.69	17.77	+3	4617.80
4	D	4619.73	5-6	D	4619.56	19.65	+3	4619.68
3	B	4621.37	4-5	B	4621.26	21.32	+3	4621.35
1	n D	4622.76	2	n D	4622.79	22.78	+3	4622.81
4-5	wn D	4629.28	5	D	4629.18	29.23	+3	4629.26
3	B	4631.25	5	B	4630.99	31.12	+3	4631.15
1	D	4634.64	...	....	....	34.58	+3	4634.61
2	D	4637.49	...	....	....	37.43	+3	4637.46
3	B	4638.63	3	B	4638.80	38.72	+3	4638.75
5-6	D	4640.47	6	D	4640.04	40.26	+3	4940.29
3	n B	4641.76	4	n B	4641.66	41.71	+3	4641.74
...	wn D	4645.86	...	....	....	45.80	+3	4645.83
2-3	B	4652.83	...	....	....	52.77	+3	4652.80

19 *PISCIUM* = 273 *SCHJELLERUP* — *Continued*

Plate G 264			Plate G 343			Mean Wave-Length		
Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		t. m.			t. m.	t. m.		t. m.
1	D	4653.89	1	D	4654.13	54.01	+3	4654.04
1	D	4656.39	1	D	4656.81	56.60	+3	4656.63
...	w B	4660.94	...	....	....	60.88	+3	4660.91
1–2	D	4664.17	...	....	....	64.11	+3	4664.14
2	n B	4665.44	...	....	....	65.38	+3	4665.41
3	wn D	4668.11	...	....	....	68.C5	+3	4668.08
4	D	4675.16	...	....	....	75.10	+3	4675.13
1	D	4682.32	...	....	....	82.26	+3	4682.29
1	n D	4688.46	...	....	....	88.40	+3	4688.43
1	n D	4691.15	...	....	....	91.09	+3	4691.12
3–4	n D	4696.59	...	....	....	96.53	+3	4696.56
...	....	....		Head	4697.1	97.2	+3	4697.2
6	wn D	4714.64	...	....	....	14.58	+3	4714.61
...	....	....		Head	4714.7	14.8	+3	4714.8
1–2	n D	4722.72	...	....	....	22.66	+3	4722.69
10	w D	4736.07	10	n D	4736.38	36.23	+3	4736.26
	Head	4737.70		Head	4737.54	37.62	+3	4737.65
7–8	B	4738.65	8	B	4738.53	38.59	+3	4738.62
...	....	....	1	D	4739.76	39.82	+3	4739.85
4–5	n D	4744.06	10	w D	4743.76	43.91	+3	4743.94
7	B	4746.69	6	B	4746.28	46.49	+3	4746.52
1	n D	4749.77	2–3	n D	4749.40	49.59	+3	4749.62
...	....	....	3	B	4754.98	55.04	+3	4755.07
...	....	....	1	D	4756.14	56.20	+3	4756.23
...	....	....	2	B	4756.85	56.91	+3	4756.94
1–2	wn D	4758.49	4–5	n D	4758.27	58.38	+3	4758.41
1	D	4765.91	1	D	4766.24	66.08	+3	4766.11
1	D	4772.67	2	nn D	4772.26	72.37	+3	4772.40
1	n D	4784.20	3	nn D	4784.07	84.14	+3	4784.17
1	n D	4789.44	2	n D	4789.36	89.40	+3	4789.43
1	n D	4815.90	2–3	n D	4815.63	15.77	+3	4815.81
1–2	n D	4823.94	...	....	....	23.88	+3	4823.91
1	n D	4827.78	1–2	n D	4827.77	27.78	+3	4827.81
1	n D	4832.78	2	n D	4832.17	32.48	+3	4832.51
...	....	....	1	n D	4836.21	36.27	+3	4836.30
...	....	....	1	n D	4839.27	39.33	+3	4839.36
...	....	....	1	D	4843.40	43.46	+3	4843.49
1	n D	4855.44	2	nn D	4855.17	55.31	+3	4855.34
...	....	....	1	n D	4859.37	59.43	+3	4859.46
1	n D	4868.45	...	....	....	68.39	+3	4868.42
1	n D	4881.60	3–4	n D	4881.71	81.66	+3	4981.69
...	....	....	2	nn D	4900.72	00.78	+3	4900.81
1–2	n D	4921.76	1	nn D	4920.23	21.00	+3	4921.03
1	n D	4924.94	...	....	....	24.88	+3	4924.91

19 *PISCIUM* = 273 *SCHJELLERUP*

Means of Four Plates

G 259			G 269			G 293			G 357			Mean Wave-Length		
Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		t.m.			t.m.			t.m.			t.m.	t.m.		t.m.
...	....	....	...	Head	68.48	...	....	.....	...	....	.....	68.48	+3	5168.51
10	w D	5173.48	7	D	73.73	1–2	wn D	73.48	2–3	n D	73.48	73.54	+3	5173.57
...	....	....	7	D	83.70	1–2	n D	83.77	...	....	.....	83.74	+3	5183.77
...	....	....	2	wn B	87.36	...	....	.....	1	B	87.19	87.28	+3	5187.31
...	....	....	...	....	.....	1	n D	88.89	1–2	n D	88.95	88.92	+3	5188.95
1	B	5190.94	4	B	91.49	1–2	n B	90.81	...	....	.....	91.08	+3	5191.11
4	wn D	5192.69	3	D	93.34	2	D	92.77	4	n D	93.31	93.03	+3	5193.06

19 *PISCIUM* = 273 *SCHJELLERUP—Continued*

G 259			G 269			G 293			G 357			Mean Wave-Length		
Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		t.m.			t.m.			t.m.			t.m.	t.m.		t.m.
2	n B	5196.92	...	....	.....	1–2	n B	97.19	1	n B	97.60	97.07	+3	5197.10
1	B	5203.76	2	n B	04.22	...	....	.....	...	....	.....	03.99	+3	5204.02
...	....	....	...	w D	08.54	...	....	.....	...	w D	08.09	08.32	+3	5208.35
3	n B	5214.40	6	B	14.85	1–2	B	14.54	...	....	.....	14.60	+3	5214.63
1	n D	5216.53	1–2	D	16.86	1	n D	16.78	...	....	.....	16.72	+3	5216.75
3-4	n B	5218.82	5	n B	18.94	1	B	18.40	...	....	.....	18.72	+3	5218.75
10	D	5226.34	7	D	26.93	1	n D	25.55	6	n D	25.80	26.16	+3	5226.19
1	n B	5229.38	3-4	B	29.95	...	....	.....	...	....	.....	29.67	+3	5229.70
2	D	5234.19	5	D	34.69	1–2	n D	34.04	3	n D	34.04	34.24	+3	5234.27
...	....	....	1	D	40.47	1	D	39.70	1–2	n D	39.55	39.91	+3	5239.94
3–4	B	5245.23	2-3	B	45.80	1–2	n B	45.00	...	....	.....	45.34	+3	5245.37
5	D	5247.32	6-7	D	47.89	3-4	n D	47.27	5	D	47.53	47.53	+3	5247.56
1–2	B	5249.28	4	B	49.83	1	n B	49.22	...	....	.....	49.44	+3	5249.47
1–2	D	5251.46	5-6	D	51.84	3	n D	51.11	5-6	D	51.20	51.41	+3	5251.44
1	nn D	5255.67	1	D	56.28	1	D	55.81	...	....	.....	55.92	+4	5255.96
6	wn D	5270.27	6	D	70.60	7	n D	70.20	4	D	70.62	70.42	+4	5270.46
2	nn B	5279.43	3	B	80.13	2–3	n B	80.03	2	n B	79.60	79.55	+4	5279.59
1	nn D	5283.79	1	D	83.87	1–2	n D	82.29	2	n D	83.12	83.13	+4	5283.17
4	n D	5297.94	6	D	98.41	3	n D	98.41	5	n D	97.86	98.15	+4	5298.19
3	n D	5302.69	2	n D	02.52	1	n D	02.82	2	n D	02.64	02.72	+4	5302.76
4	n B	5305.00	4	B	05.01	1	B	05.80	1–2	n B	05.08	05.22	+4	5305.26
2	n B	5312.99	2	n B	13.33	2	n B	13.17	2	n B	13.21	13.18	+4	5313.22
1	n D	5314.69	1	n D	15.51	3	n D	15.44	3	n D	15.27	15.23	+4	5315.27
4	nn B	5318.12	6	B	18.00	4	n B	17.66	3	n B	17.72	17.87	+4	5317.91
...	....	....	1–2	D	20.62	2	n D	20.95	2	n D	21.18	20.95	+4	5320.99
...	....	....	1	D	25.63	1	n D	25.31	1	n D	25.18	25.28	+4	5325.32
10	w D	5329.03	6	n D	29.22	2–3	n D	28.76	2	n D	28.93	28.99	+4	5329.03
...	....	....	...	....	.....	...	....	.....	1–2	n D	36.90	36.90	+4	5336.94
5–6	wn B	5339.11	3–4	B	39.59	1–2	B	39.45	2–3	n B	39.11	39.32	+4	5339.36
1	D	5341.15	2	D	41.50	4	D	41.17	2	n D	41.22	41.26	+4	5341.30
2	wn D	5350.19	3	wn D	50.12	3	D	50.08	4	n D	49.73	50.03	+4	5350.07
2	nn B	5352.64	2–3	B	52.92	2	wn B	52.70	1	n B	52.43	52.67	+4	5352.71
...	....	....	1	D	62.95	...	....	.....	1	D	62.69	62.95	+4	5362.99
...	....	....	0-1	D	67.39	2	n D	66.69	1	n D	66.61	66.90	+4	5366.94
...	....	....	2-3	B	68.89	2	B	68.59	...	....	.....	68.74	+4	5368.78
8	wn D	5372.06	9	D	71.64	9	w D	71.69	8	D	71.25	71.66	+4	5371.70
6	B	5374.98	8-9	B	75.40	5–6	n B	75.93	5	B	74.93	75.34	+4	5375.38
1	n D	5377.10	0–1	D	78.17	2	n D	77.60	2	D	77.32	77.54	+4	5377.58
...	....	....	2-3	B	79.58	4	wn B	80.08	3	n B	79.77	79.78	+4	5379.82
...	....	....	1	D	91.77	1	D	90.65	1	nn D	90.76	91.05	+4	5391.09
3	n D	5397.43	3	D	97.67	1	D	97.70	4	n D	97.35	97.54	+4	5397.58
2	n B	5403.70	2	B	04.33	...	....	.....	...	....	.....	03.90	+4	5403.94
0–1	n D	5406.19	1	n D	06.81	1–2	n D	06.49	1	n D	06.05	06.39	+4	5406.43
2–3	n D	5410.25	2	D	10.99	2–3	D	10.55	4	D	09.94	10.24	+4	5410.28
2–3	n B	5412.47	1	B	12.82	1	B	12.50	...	....	.....	12.60	+4	5412.64
...	....	....	1	D	15.01	1	D	14.01	1	n D	14.21	14.41	+4	5414.45
7–8	B	5417.38	6–7	wn B	17.49	7	wn B	16.98	6–7	n B	17.14	17.25	+4	5417.29
2-3	n D	5420.21	2–3	D	20.53	2	D	19.87	2–3	D	19.89	20.13	+4	5420.17
4	B	5423.16	5–6	B	23.53	4	n B	23.18	2–3	n B	22.90	23.19	+4	5423.23
...	....	....	1	D	25.76	1	D	25.09	1	D	24.73	25.20	+4	5425.24
3	n B	5428.15	5	B	28.00	2–3	B	27.69	...	....	.....	27.95	+4	5427.99
2	n D	5430.37	4	D	30.67	3	D	30.30	3	D	30.08	30.35	+4	5430.39
2	B	5432.21	3	B	32.61	2	B	32.21	...	....	.....	32.34	+4	5432.38
...	....	....	1	D	34.69	1	D	33.92	2	D	33.88	34.16	+4	5434.20
...	....	....	0-1	D	39.00	1	n D	38.82	2	D	38.55	38.79	+4	5438.83
5-6	B	5445.51	5	B	45.40	1	B	45.07	2	n B	44.63	45.15	+4	5445.19
4	n D	5448.30	6	D	48.38	10	D	47.99	5–6	D	47.73	48.10	+4	5448.14
4	n B	5451.05	3	B	51.55	2	B	50.65	1–2	B	50.79	51.01	+4	5451.05
4–5	n B	5454.19	3	B	54.34	2–3	B	53.65	2	B	53.14	53.81	+4	5453.85
1	n D	5457.13	2–3	D	57.06	3-4	n D	56.79	4	D	56.71	56.92	+4	5456.96
2–3	n B	5459.19	1–2	B	59.49	2	B	58.97	1	B	58.73	59.10	+4	5459.14
...	....	....	1	D	61.36	2	D	60.89	2	D	60.61	60.95	+4	5460.99
2	B	5462.84				1–2	n B	62.77	2	B	63.01	62.87	+4	5462.91
			4	B	63.72							63.72	+4	5463.76
2	B	5465.41				...	....	.....	1–2	B	64.81	65.11	+4	5465.15
...	....	....	...	w D	68.47	0–1	D	67.99	2	n D	66.90	67.79	+4	5467.83
3	n B	5471.99	2	B	72.78	3	n B	72.27	2	B	72.11	72.39	+4	5472.43
...	....	....	1	D	74.82	1–2	n D	74.47	2	n D	74.28	74.52	+4	5474.56

19 *PISCIUM*=273 *SCHJELLERUP*—*Continued*

G 259			G 269			G 293			G 357			Mean Wave-Length		
Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		t.m.			t.m.			t.m.			t.m.	t.m.		t.m.
...	....	....	1	D	78.10	...	....	.....	1-2	n D	78.00	78.05	+4	5478.09
...	....	....	5	B	80.70	1	B	80.99	...	....	.....	80.85	+4	5480.89
2	D	5482.52	2	D	83.19	2	D	82.63	2-3	D	82.44	82.69	+4	5482.73
2-3	n B	5495.77	1-2	B	96.47	2	n B	95.85	...	....	.....	96.03	+4	5496.07
2-3	n D	5498.52	4-5	D	98.54	4-5	D	98.13	3	D	97.71	98.23	+4	5498.27
1	nn D	5501.96	1-2	n D	02.02	1	D	02.12	2	D	02.01	02.03	+4	5502.07
1	n D	5506.76	0-1	D	07.66	1	n D	06.92	1	D	07.23	07.14	+4	5507.18
2	n B	5509.15	4	n B	09.18	1-2	B	09.89	...	....	.....	09.47	+4	5509.51
1	n B	5510.90	...	....	.....	2-3	B	10.45	...	....	.....	10.68	+4	5510.72
...	....	....	1	D	13.06	1-2	n D	12.57	1-2	n D	12.34	12.66	+4	5512.70
...	....	....	0-1	D	25.05	1	n D	24.16	1	n D	23.99	24.40	+4	5524.44
1	D	5528.45	0-1	D	28.41	...	...	.....	1-2	D	27.92	28.20	+4	5528.24
...	....	....	2	B	32.10	2	n B	31.83	1	n B	31.68	31.92	+4	5531.96
...	....	....	1	D	34.37	1-2	D	33.70	1	D	33.41	33.83	+4	5533.87
2	n D	5539.86	8	n D	39.79	10	w D	39.46	7	n D	39.67	39.69	+4	5539.73
...	....	....	Head	....	41.75	...	....	.....	...	....	.....	41.75	+4	5541.79
...	....	....	6	B	43.84	2-3	n B	43.35	...	....	.....	43.40	+4	5543.44
1	n D	5547.95	1	D	48.75	1	n D	48.28	2	n D	48.20	48.30	+4	5548.34
...	....	....	1	D	52.50	1	n D	52.45	1	n D	52.19	52.38	+4	5552.42
...	....	....	2	B	54.55	2	B	54.01	3	B	54.06	54.25	+4	5554.29
...	....	....	1	D	56.64	1	D	56.25	1-2	D	55.96	56.28	+4	5556.32
1	n D	5562.42	1-2	n D	62.81	1	D	62.85	2	D	62.28	62.51	+4	5562.55
3	n B	5564.30	2-3	B	64.75	2	B	64.57	2	B	64.15	64.45	+4	5564.49
1	D	5566.29	2-3	D	66.99	1-2	D	66.70	2	n D	66.27	66.56	+4	5566.60
...	....	....	1	D	70.67	1	D	69.91	1	D	70.17	70.25	+4	5570.29
...	....	....	0-1	D	74.21	1	D	73.20	1	D	73.17	73.53	+4	5573.57
...	....	....	...	....	.....	1	B	74.75	...	....	.....	74.75	+4	5574.79
...	....	....	...	....	.....	1	D	76.45	1	D	76.07	76.46	+4	5576.49
8	n D	5583.84	8-9	D	84.05	10	n D	83.91	8	D	83.95	83.94	+4	5583.98
...	....	....	Head		85.76	...	....	.....	...	....	.....	85.76	+4	5585.80
3	B	5586.80	5	B	87.21	4-5	B	86.90	4	B	86.79	86.93	+4	5586.97
...	....	....	1	n D	89.28	1	n D	89.13	2	n D	88.56	89.02	+4	5589.06
...	....	....	1-2	n B	92.45	2	n B	92.07	1-2	B	92.18	92.23	+4	5592.27
...	....	....	1	n D	95.29	1	D	94.26	1-2	n D	93.86	94.47	+4	5594.51
6	n B	5597.15	4	B	97.69	3-4	B	97.40	1-2	B	97.13	97.47	+4	5597.51
...	....	....	1	n D	99.97	1	n D	99.66	1	n D	99.05	99.56	+4	5599.60
...	....	....	...	....	.....	1	B	06.36	...	....	.....	06.36	+4	5606.40
1	n D	5609.13	1-2	n D	09.55	1	n D	09.02	3	n D	09.48	09.17	+4	5609.22
...	....	....	0-1	D	15.87	0-1	D	15.60	1	n D	15.09	15.52	+4	5615.56
2	n B	5617.04	2	B	17.64	...	....	.....	...	....	.....	17.34	+4	5617.38
...	....	....	1-2	n D	20.02	2-3	n D	19.97	3-4	n D	20.10	20.03	+4	5620.07
...	....	....	...	....	.....	1	B	22.25	...	....	.....	22.25	+4	5622.29
2	n D	5624.60	2	n D	24.81	2	n D	24.74	4-5	n D	24.52	24.67	+4	5624.71
...	....	....	2	B	27.62	1	B	27.71	...	....	.....	27.66	+4	5627.70
...	....	....	2-3	B	30.60	1-2	B	30.70	...	....	.....	30.65	+4	5630.69
8	n D	5634.21	10	D	34.00	10	D	34.46	10	D	33.92	34.17	+4	5634.21
...	Head	5635.96	...	....	36.05	...	...	36.36	...	....	36.39	36.09	+4	5636.13
...	....	....	6	B	37.49	3	B	37.48	1	B	37.69	37.55	+4	5637.59
...	....	....	6	B	41.06	2-3	B	41.26	1-2	B	41.01	41.08	+4	5641.12
...	....	....	1	D	43.69	1	n D	43.65	1	n D	44.75	44.03	+4	5644.07
...	....	....	3-4	n B	46.83	1	n B	47.11	1	n B	46.23	46.71	+4	5646.75
...	....	....	0-1	D	50.00	1	n D	49.76	1	D	49.77	49.84	+4	5649.88
...	....	....	5-6	B	53.37	1	B	53.42	...	....	.....	53.40	+4	5653.44
3-4	B	5655.18	5	B	54.74	1-2	B	55.02	2	B	55.29	55.06	+4	5655.10
...	....	....	1	D	59.01	1-2	D	58.73	3	n D	57.93	58.65	+4	5658.69
4	n B	5673.49	2-3	B	73.92	3	B	73.94	3	B	73.35	73.72	+4	5673.76
1	D	5676.64	1-2	D	76.35	1-2	n D	76.31	2-3	D	76.05	76.37	+4	5676.41
...	....	....	1	B	79.09	1	n B	79.39	1-2	B	79.02	79.17	+4	5679.21
...	....	....	1	B	84.48	1	n B	84.52	1	B	83.75	84.25	+4	5684.29
1	n D	5686.88	1	D	87.12	1-2	n D	87.61	1	n D	86.66	87.07	+4	5687.11
...	....	....	4-5	B	93.67	3-4	B	93.98	4-5	n B	93.57	93.74	+4	5693.78
...	....	....	0-1	D	97.10	1	D	96.72	2	n D	96.49	96.77	+4	5696.81
5	n B	5704.61	3	B	05.58	3	n B	05.62	3	B	05.13	05.37	+4	5705.41
...	....	....	1-2	D	08.26	1-2	D	08.55	2-3	D	07.84	08.17	+4	5708.21
2	n B	5709.74	2	B	10.76	1-2	B	10.83	1-2	B	10.30	10.41	+4	5710.45
...	....	....	1	D	12.77	1	n D	13.35	1-2	D	12.57	12.90	+4	5712.94
...	....	....	1	B	14.96	...	....	.....	...	....	.....	14.96	+4	5715.00
...	....	....	3	B	16.82	5	n B	16.90	3	B	17.27	17.01	+4	5717.05

19 *PISCIUM* = 273 *SCHJELLERUP*—*Continued*

G 259			G 269			G 293			G 357			Mean Wave-Length		
Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		t.m.			t.m.			t.m.			t.m.	t.m.		t.m.
6	B	5717.92	2	B	17.74	...	....	.....	...	....	.....	17.83	+4	5717.87
...	....	....	1	n D	22.01	1	n D	20.95	2	D	21.12	21.36	+4	5721.40
8	n B	5724.00	4–5	n B	24.31	2–3	B	24.13	2	B	23.80	24.08	+4	5724.12
1	D	5730.46	3	n D	31.76	3	n D	31.40	1–2	n D	31.44	31.16	+4	5731.20
...	....	....	2	n D	44.34	1	n D	44.75	3	n D	43.85	44.31	+4	5744.35
...	....	....	1	n B	46.95	1	n B	47.15	...	....	.....	47.05	+4	5747.09
...	....	....	1	n D	49.08	1	n D	50.02	...	....	.....	49.55	+4	5749.59
...	....	....	3	n B	56.89	2–3	n B	57.06	...	....	.....	56.98	+4	5757.02
...	....	....	3	n D	62.80	1	n D	62.59	2–3	n D	62.79	62.70	+4	5762.74
...	....	....	2–3	n B	66.90	1–2	n B	67.60	...	....	.....	67.25	+4	5767.29
...	....	....	2–3	n D	71.27	1	n D	70.73	4	n D	71.44	71.15	+4	5771.19
...	....	....	1–2	n B	75.49	1–2	n B	76.08	1	B	75.74	75.77	+4	5775.81
...	....	....	1	n D	77.76	1	n D	77.79	1	D	77.78	77.78	+4	5777.82
...	....	....	1–2	B	80.18	1–2	n B	79.73	1	B	79.55	79.82	+4	5779.86
...	....	....	3	n D	85.13	1	n D	85.92	...	....	.....	85.53	+4	5785.57
...	....	....	1–2	D	98.66	1	n D	98.61	1–2	D	98.16	98.64	+4	5798.68
...	....	....	1	n D	22.69	...	....	.....	1	D	22.69	22.69	+4	5822.73

280 *SCHJELLERUP*

Plate G 346 1899, October 18, G.M.T. 16^h1. Hour angle, W 1^h5 Star fair; comparison good						Plate G 367 1899, December 29, G.M.T. 11^h2. Hour angle, W $4^h\pm$ Star fair; comparison good						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
...	....	....	....	....	....	...	nn D	62.2999	4429.56	−34	4429.22	29.14	+37	4429.51
3	nn D	49.1115	4434.67	+ 9	4434.76	...	....	....	....	....	....	34.85	+37	4435.22
...	....	....	....	....	....	...	nn D	62.0955	4436.12	−35	4435.77	35.69	+37	4436.06
...	....	....	....	....	....	B {	from	62.0720	4436.88	−35	4436.5	36.4	+37	4437.0
...	....	....	....	....	....		to	61.9785	4439.92	−36	4439.56	39.48	+37	4439.9
...	nn B	49.9832	4463.24	+ 5	4463.29	...	....	....	....	....	....	63.38	+38	4463.76
...	....	....	....	....	....	4	wn D	61.1895	4466.08	−42	4465.66	65.58	+38	4465.96
...	....	....	....	....	....	1	n D	61.0215	4471.77	−43	4471.34	71.26	+38	4471.64
...	nn D	50.5099	4481.06	+ 2	4481.08	1	n D	60.7203	4482.09	−45	4481.64	81.36	+38	4481.74
1	n D	50.7400	4488.98	+ 1	4488.99	1	n D	60.5093	4489.41	−47	4488.94	88.97	+38	4489.35
...	nn D	50.9450	4496.11	0	4496.11	...	wn D	60.2908	4497.07	−48	4496.59	96.35	+38	4496.73
...	nn D	51.0778	4500.76	− 1	4500.75	...	....	....	....	....	....	00.84	+38	4501.22
2	D	51.2257	4505.98	− 2	4505.96	2	n D	60.0242	4506.51	−48	4506.03	06.00	+38	4506.38
...	nn D	51.4054	4512.36	− 3	4512.33	3	nn D	59.8414	4513.06	−49	4512.57	12.45	+38	4512.83
1–2	nn D	51.5497	4517.53	− 4	4517.49	2	n D	59.6899	4518.53	−49	4518.04	17.77	+38	4518.15
1–2	nn B	51.6385	4520.73	− 5	4520.68	...	....	....	....	....	....	20.77	+38	4521.15
...	nn D	51.6825	4522.32	− 5	4522.27	1	n D	59.5592	4523.28	−49	4522.79	22.53	+38	4522.91
1	n B	51.7274	4523.94	− 5	4523.89	...	....	....	....	....	....	24.98	+38	4525.36
...	w D	51.8039	4526.73	− 5	4526.68	1–2	n D	59.4587	4526.96	−49	4526.47	26.58	+38	4526.96
...	....	....	....	....	....		from	59.352	4530.88	−49	4530.39	30.31	+38	4530.7
...	wn D	52.0274	4534.89	− 6	4534.83	D {	....	....	....	....	....	34.92	+38	4535.30
...	....	....	....	....	....		to	59.213	4536.01	−49	4535.52	35.44	+38	4535.8
...	w B	52.1002	4537.58	− 7	4537.51	...	....	....	....	....	....	37.60	+38	4537.98
1	n D	52.1520	4539.49	− 7	4539.42	...	....	....	....	....	....	39.51	+38	4539.89
...	w D	52.5197	4553.21	− 9	4553.12	9	w D	58.7399	4553.76	−49	4553.27	53.20	+38	4553.58
B {	from	52.569	4555.08	− 9	4555.0	...	....	....	....	....	....	55.09	+38	4555.5
	to	52.669	4558.86	− 9	4558.8	...	....	....	....	....	....	58.89	+38	4559.3
...	....	....	....	....	....	...	nn D	58.5685	4560.29	−48	4559.81	59.73	+38	4560.11
1	D	52.7667	4562.56	−10	4562.46	...	....	....	....	....	....	62.55	+38	4562.93
0–1	D	52.8267	4564.85	−10	4564.75	...	....	....	....	....	....	64.84	+38	4565.22
B {	from	52.844	4565.52	−10	4565.4	...	....	....	....	....	....	65.48	+38	4565.9
	to	52.937	4569.09	−10	4569.0	...	....	....	....	....	....	69.08	+38	4569.5
...	nn D	52.9930	4571.41	−10	4571.31	...	nn D	58.2920	4571.53	−47	4571.06	71.15	+38	4571.53
...	....	....	....	....	....	...	nn D	58.1352	4577.06	−46	4576.60	76.52	+38	4576.90

280 *SCHJELLERUP—Continued*

PLATE G 346						PLATE G 367						MEAN WAVE-LENGTH		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
5–6	wn B	53.3020	4583.22	−10	4583.12	...	....	....	....	....	....	83.21	+38	4583.59
2	n D	53.3707	4585.91	−10	4585.81	2	n D	57.8917	4586.64	−45	4586.19	86.00	+38	4586.38
1	n D	53.5710	4593.82	−10	4593.72	...	....	....	....	....	....	93.81	+38	4594.19
2	nn B	53.6198	4595.74	−10	4595.64	...	....	....	....	....	....	95.73	+38	4596.11
1	n B	53.7070	4599.21	−10	4599.11	...	....	....	....	....	....	99.20	+38	4599.58
7	D	53.8745	4605.92	− 9	4605.83	8	D	57.3998	4606.35	−42	4605.93	05.88	+38	4606.26
...	....	....	....	....	....	B	from	57.3680	4607.64	−42	4607.22	07.14	+38	4607.5
3	n B	53.9284	4608.09	− 9	4608.00	...	....	....	....	....	....	08.09	+38	4608.47
1	n D	54.1182	4615.79	− 8	4615.71	to	nn D	57.1620	4616.06	−41	4615.65	15.68	+38	4616.06
4	B	54.1567	4617.35	− 8	4617.27	...	....	....	....	....	....	17.36	+38	4617.74
1	n D	54.1922	4618.80	− 8	4618.72	...	....	....	....	....	....	18.91	+38	4619.29
...	nn D	54.4330	4628.72	− 6	4628.66	...	....	....	....	....	....	28.75	+38	4629.13
4	n B	54.4779	4630.56	− 6	4630.50	...	n B	56.8002	4631.06	−38	4630.68	30.59	+38	4630.97
2	n B	54.6472	4637.61	− 5	4637.56	...	....	....	....	....	....	37.65	+38	4638.03
3	D	54.6947	4639.60	− 5	4639.55	...	nn D	56.5932	4639.77	−36	4639.41	39.48	+38	4639.86
...	....	....	....	....	....		from	56.5715	4640.69	−36	4640.33	40.25	+38	4640.6
...	....	....	....	....	....	B		....	....	....	....	41.72	+38	4642.10
1–2	n B	54.7444	4641.68	− 5	4641.63		to	56.4825	4644.47	−35	4644.12	44.04	+38	4644.4
3	D	54.8347	4645.49	− 4	4645.45	5	n D	56.4412	4646.23	−35	4645.88	45.67	+38	4646.05
...	....	....	....	....	....	...	nn D	56.2302	4655.27	−33	4654.94	54.86	+39	4655.25
...	....	....	....	....	....		from	56.1785	4657.50	−32	4657.18	57.10	+39	4657.5
2–3	n B	55.1780	4660.01	− 1	4660.00	B		....	....	....	....	60.09	+39	4660.48
...	....	....	....	....	....		to	56.0695	4662.23	−31	4661.92	61.84	+39	4662.2
1	D	55.2574	4663.44	0	4663.44	...	....	....	....	....	....	63.53	+39	4663.92
1	n B	55.2852	4664.73	0	4664.73	...	....	....	....	....	....	64.82	+39	4665.21
4	D	55.3472	4667.41	+ 1	4667.42	...	nn D	55.9283	4668.39	−29	4668.10	67.76	+39	4668.15
2	D	55.5047	4674.27	+ 3	4674.30	...	nn D	55.7829	4674.78	−28	4674.50	74.40	+39	4674.79
...	wn D	55.6657	4681.78	+ 5	4681.83	...	nn D	55.6204	4681.98	− 27	4681.71	81.77	+39	4682.16
...	nn D	56.3944	4714.06	+17	4714.23	5	wn D	54.9117	4714.14	−18	4713.96	14.10	+39	4714.49
...	nn D	56.6945	4727.92	+22	4728.14	...	nn D	54.6045	4728.47	−17	4728.30	28.22	+39	4728.61
...	....	....	....	....	....	D	from	54.5010	4733.35	−17	4733.18	33.10	+39	4733.5
...	....	....	....	....	....		to	54.4140	4737.48	−16	4737.32	37.24	+39	4737.6
4	n B	56.9179	4738.38	+24	4738.62	...	....	....	....	....	....	38.71	+39	4739.10
...	....	....	....	....	....	B	to	54.3400	4741.00	−16	4740.84	40.76	+39	4741.2
...	....	....	....	....	....	D	from	54.3385	4741.07	−16	4740.91	40.83	+39	4741.2
10	wn D	57.0089	4742.67	+25	4742.92	...	....	....	....	....	....	43.01	+39	4743.40
...	Head	57.0499	4744.62	+25	4744.87	...	Head	54.2550	4745.06	−15	4744.91	44.89	+39	4745.28
...	n B	57.0845	4746.26	+25	4746.51	...	....	....	....	....	....	46.60	+39	4746.99
...	....	....	....	....	....	B	to	54.1801	4748.66	−14	4748.52	48.44	+40	4748.8
...	....	....	....	....	....	...	nn D	54.1429	4750.45	−14	4750.31	50.23	+40	4750.63
...	wn B	57.2724	4755.23	+27	4755.50	...	w B	54.0438	4755.25	−13	4755.12	55.31	+40	4755.71
5	n D	57.3385	4758.41	+27	4758.68	4	n D	53.9742	4758.63	−13	4758.50	58.59	+40	4758.99
1	n D	57.4955	4766.01	+28	4766.29	...	....	....	....	....	....	66.38	+40	4766.78
...	nn B	57.5354	4767.94	+28	4768.22	...	....	....	....	....	....	68.31	+40	4768.71
...	wn D	57.8460	4783.22	+30	4783.52	...	wn D	53.4997	4782.05	−10	4781.95	82.7 ±	+40	4783.1 ±
...	....	....	....	....	....	...	nn D	53.0248	4806.12	− 9	4806.03	05.95	+40	4806.35
...	nn B	58.4324	4812.73	+31	4813.04	...	....	....	....	....	....	13.13	+40	4813.53
2	n D	58.4695	4814.64	+31	4814.95	...	....	....	....	....	....	15.04	+40	4815.44
...	nn B	58.5190	4817.18	+31	4817.49	...	nn B	52.7895	4818.30	− 8	4818.22	17.86	+40	4818.26
...	....	....	....	....	....	...	nn D	52.7088	4822.51	− 8	4822.43	22.35	+40	4822.75
...	....	....	....	....	....	1	n D	52.6368	4826.28	− 8	4826.20	26.12	+40	4826.52
...	nn D	58.7982	4831.66	+30	4831.96	2	n D	52.5227	4832 30	− 8	4832.22	32.09	+40	4832.49
...	....	....	....	....	....	...	nn D	52.3259	4839.54	− 8	4839.46	39.38	+40	4839.78
...	....	....	....	....	....	...	nn B	52.0585	4857.18	− 9	4857.09	57.01	+41	4857.42
9	B	59.3436	4860.61	+27	4860.88	...	....	....	....	....	....	60.97	+41	4861.38
Limits of above		59.3192	4859.29	+27	4859.56	...	....	....	....	....	....	59.65	+41	4860.1
		59.3710	4862.08	+27	4862.35	...	....	....	....	....	....	62.44	+41	4862.9
3	D	59.4042	4863.88	+27	4864.15	...	nn D	51.9090	4865.34	−10	4865.24	64.70	+41	4865.11
...	....	....	....	....	....	...	nn D	51.7328	4875.05	−11	4874.94	74.86	+41	4875.27
...	....	....	....	....	....	B	from	51.7085	4876.40	−11	4876.29	76.21	+41	4876.6
...	....	....	....	....	....		to	51.6390	4880.26	−11	4880.15	80.07	+41	4880.5
...	....	....	....	....	....	Max	B	51.6740	4878.31	−11	4878.20	78.12	+41	4878.53
...	....	....	....	....	....	...	nn D	51.6105	4881.85	−11	4881.74	81.66	+41	4882.07
...	....	....	....	....	....	...	nn D	51.4683	4889.82	−12	4889.70	89.62	+41	4890.03
...	....	....	....	....	....	B	from	51.3685	4895.45	−13	4895.32	95.24	+41	4895.7
...	....	....	....	....	....		to	51.2960	4899.56	−14	4899.42	99.34	+41	4899.8

280 *SCHJELLERUP — Continued*

PLATE G 346						PLATE G 367						MEAN WAVE-LENGTH		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
...	....	....	....	....	....	Max	B	51.3245	4897.94	−13	4897.81	97.73	+41	4898.14
...	....	....	....	....	....	1–2	nn D	51.2795	4900.51	−14	4900.37	00.29	+41	4900.70
...	....	....	....	....	....	...	nn D	50.9320	4920.49	−17	4920.32	20.24	+41	4920.65

280 *SCHJELLERUP*

PLATE G 366 1899, December 28, G.M.T. 11h6. Hour angle, W 5h± Star fair; comparison good						PLATE G 370 1900, January 2, G.M.T. 11h1. Hour Angle, W 5h5 Star fair; comparison good						MEAN WAVE-LENGTH		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
Spectrum	begins	40.9180	5170.70	−43	5170.27	...	....	48.7620	5168.48	−29	5168.19	69.23	+42	5169.7
...	....	....	....	....	....	...	nn D	48.9115	5174.48	−33	5174.15	73.92	+43	5174.35
...	nn D	41.2347	5183.60	−43	5183.17	...	....	....	....	....	....	83.45	+43	5183.88
3	n D	41.4822	5193.76	−43	5193.33	2	n D	49.3884	5193.87	−45	5193.42	93.38	+43	5193.81
D	from	41.7300	5204.03	−45	5203.58	...	....	....	....	....	....	03.81	+43	5204.3
						...	w D	49.7854	5210.28	−51	5209.77	09.54	+43	5209.97
	to	41.9395	5212.78	−47	5212.31	...	....	....	....	....	....	12.54	+43	5213.0
...	wn D	42.2515	5225.95	−49	5225.46	8	w D	50.1743	5226.60	−55	5226.05	25.76	+43	5226.19
...	....	....	....	....	....	B	from	50.2250	5228.75	−56	5228.19	27.96	+43	5228.4
...	....	....	....	....	....		to	50.6380	5246.40	−57	5245.83	45.60	+43	5246.0
...	....	....	....	....	....	...	n D	50.3650	5234.70	−57	5234.13	33.90	+43	5234.33
...	nn D	42.7508	5247.38	−51	5246.87	2	n D	50.6702	5247.78	−56	5247.22	47.05	+43	5247.48
...	nn D	42.8324	5250.92	−51	5250.41	1	n D	50.7688	5252.04	−56	5251.48	50.95	+43	5251.4
5	n D	43.2787	5270.48	−49	5269.99	4	n D	51.2009	5270.91	−54	5270.37	70.18	+44	5270.62
2–3	n D	43.5644	5283.19	−48	5282.71	...	nn D	51.4825	5283.38	−50	5282.88	82.80	+44	5283.24
2	n D	43.8934	5298.01	−45	5297.56	...	nn D	51.8159	5298.33	−45	5297.88	97.72	+44	5298.16
1	n D	43.9923	5302.50	−45	5302.05	...	....	....	....	....	....	02.28	+44	5302.72
...	nn D	44.1069	5307.73	−43	5307.30	...	....	....	....	....	....	07.53	+44	5307.97
...	nn D	44.2664	5315.05	−41	5314.64	...	....	....	....	....	....	14.87	+44	5315.31
...	nn D	44.3880	5320.68	−40	5320.28	...	....	....	....	....	....	20.51	+44	5320.95
...	wn D	44.5779	5329.48	−36	5329.12	...	w D	52.5064	5329.94	−35	5329.59	29.36	+44	5329.80
...	nn D	44.7330	5336.73	−35	5336.38	...	....	....	....	....	....	36.61	+44	5337.05
...	...	....	....	....	....	1	n D	52.7540	5341.49	−32	5341.17	41.40	+44	5341.84
4	D	45.0102	5349.81	−30	5349.51	3	n D	52.9510	5350.76	−29	5350.47	49.99	+44	5350.43
...	...	....	....	....	....	2	B	53.0073	5353.43	−28	5353.15	52.92	+45	5353.37
...	...	....	....	....	....	Con. Spec.	from	53.0430	5355.12	−28	5354.84	54.61	+45	5355.1
...	...	....	....	....	....		to	53.3530	5369.93	−24	5369.69	69.46	+44	5369.9
10	w D	45.4645	5371.56	−25	5371.31	8	D	53.3993	5372.15	−23	5371.92	71.62	+45	5372.07
2	B	45.5302	5374.74	−25	5374.49	3	B	53.4640	5375.27	−22	5375.05	74.77	+45	5375.22
...	nn D	45.5707	5376.71	−24	5376.47	...	n D	53.5124	5377.81	−22	5377.59	77.03	+45	5377.48
B	from	45.5880	5377.55	−24	5377.31	...	....	....	....	....	....	77.54	+45	5378.0
						Max	B	53.5632	5380.07	−21	5379.86	80.09	+45	5380.54
	to	45.6610	5381.11	−23	5380.88	...	....	....	....	....	....	81.11	+45	5381.6
Con. Spec.	from	45.7350	5384.71	−22	5384.49	...	....	....	....	....	....	84.72	+45	5385.2
	to	45.8425	5389.98	−22	5389.76	...	....	....	....	....	....	89.99	+45	5390.4
...	nn D	45.8650	5391.09	−21	5390.88	...	nn D	53.7980	5391.52	−19	5391.33	91.11	+45	5391.56
6	D	45.9830	5396.91	−21	5396.70	4	n D	53.9200	5397.51	−17	5397.34	97.02	+45	5397.47
...	...	....	....	....	....	B	from	53.9680	5399.88	−17	5399.71	99.48	+45	5399.9
...	D	46.1617	5405.77	−19	5405.58							05.81	+45	5406.26
...	...	....	....	....	....		to	54.0840	5405.61	−16	5405.45	05.22	+45	5405.7
...	...	....	....	....	....	1	B	54.1377	5408.27	−15	5408.12	07.89	+45	5408.33
3	D	46.2497	5410.16	−18	5409.98	...	nn D	54.1800	5410.37	−15	5410.22	10.10	+45	5410.55
B	from	46.2950	5412.42	−18	5412.24	B	from	54.2520	5413.97	−14	5413.83	13.03	+45	5413.5
	to	46.4160	5418.49	−17	5418.31		to	54.3540	5419.07	−13	5418.94	18.61	+45	5419.1
...	...	....	....	....	....	Max	....	54.3223	5417.48	−13	5417.35	17.58	+45	5418.03
2–3	D	46.4445	5419.92	−17	5419.75	...	nn D	54.3795	5420.34	−12	5420.22	19.99	+45	5420.44

280 *SCHJELLERUP—Continued*

PLATE G 366						PLATE G 370						MEAN WAVE-LENGTH		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
1-2	B	46.5025	5422.85	−17	5422.68	...	....	....	....	....	....	22.94	+45	5423.39
1	D	46.5524	5425.38	−16	5425.22	...	....	....	....	....	....	25.45	+45	5425.90
1-2	B	46.5820	5426.87	−16	5426.71	...	....	....	....	....	....	26.94	+45	5427.39
...	n D	46.6404	5429.84	−16	5429.68	...	nn D	54.5747	5430.18	−11	5430.07	29.88	+45	5430.33
...	....	....	....	....	....	1	n B	54.6125	5432.10	−10	5432.00	32.23	+45	5432.68
2	D	46.7243	5434.11	−15	5433.96	...	nn D	54.6612	5434.56	−10	5434.46	34.21	+45	5434.66
2	D	46.8110	5438.53	−15	5438.38							38.61	+45	5439.06
B	from	46.8465	5440.35	−15	5440.20	B	from	54.7800	5440.62	− 9	5440.53	40.37	+45	5440.8
	to	46.9510	5445.72	−14	5445.58		to	54.8940	5446.46	− 8	5446.38	45.98	+45	5446.4
4	D	46.9884	5447.65	−14	5447.51	...	nn D	54.9297	5448.28	− 8	5448.20	47.86	+45	5448.31
	from	47.0290	5449.74	−14	5449.60	...	....	....	....	....	....	49.83	+46	5450.3
B	....	....	....	....	....	6	w B	55.0112	5452.48	− 7	5452.41	52.18	+46	5452.64
	to	47.1195	5454.42	−13	5454.29	...	....	....	....	....	....	54.52	+46	5455.0
4	D	47.1517	5456.04	−13	5455.91	...	nn D	55.0857	5456.33	− 7	5456.26	56.08	+46	5456.54
1	B	47.2005	5458.63	−13	5458.50	2	n B	55.1330	5458.78	− 7	5458.71	58.61	+46	5459.07
2	D	47.2378	5460.57	−13	5460.44	...	....	....	....	....	....	60.67	+46	5461.13
2	B	47.2923	5463.42	−13	5463.29	3	n B	55.2310	5463.87	− 7	5463.80	63.55	+46	5464.01
...	nn D	47.3509	5466.48	−13	5466.35	1	n D	55.2845	5466.65	− 6	5466.59	66.47	+46	5466.93
...	nn D	47.5084	5474.76	−12	5474.64	1	n D	55.4374	5474.66	− 6	5474.60	74.62	+46	5475.08
...	....	....	....	....	....	1	n D	55.5940	5482.91	− 6	5482.85	82.62	+46	5483.08
1	n D	48.1050	5506.63	−13	5506.50	...	....	....	....	....	....	06.73	+46	5507.19
Con.	from	48.1300	5507.99	−13	5507.86	...	....	....	....	....	....	08.09	+46	5508.6
						4	n B	56.0978	5509.85	− 8	5509.77	09.54	+46	5510.00
Spec.	to	48.2095	5512.30	−13	5512.17							12.40	+46	5512.9
...	....	....	....	....	....		from	56.1430	5512.30	− 8	5512.22	11.99	+46	5512.5
5-6	w D	48.2440	5514.18	−13	5514.05	D	nn D					14.28	+46	5514.74
...	....	....	....	....	....			56.2182	5516.37	− 9	5516.28	16.05	+46	5516.51
Con.	from	48.3070	5517.60	−13	5517.47		to	56.2390	5517.51	− 9	5517.42	17.45	+46	5517.9
Spec.	to	48.4820	5527.20	−14	5527.06	...	....	....	....	....	....	27.29	+46	5527.8
2	n D	48.5019	5528.30	−14	5528.16	...	....	....	....	....	....	28.39	+46	5528.85
2	n B	48.5527	5531.11	−14	5530.97	...	....	....	....	....	....	31.20	+46	5531.66
1	n D	48.5915	5533.24	−14	5533.10	...	....	....	....	....	....	33.33	+46	5533.79
D	from	48.6560	5536.80	−14	5536.66	...	....	....	....	....	....	36.89	+46	5537.4
	to	48.7470	5541.90	−15	5541.75	...	....	....	....	....	....	41.98	+46	5542.4
...	nn B	48.9644	5554.04	−17	5553.87	Max	B	56.9077	5554.43	−16	5554.27	54.07	+47	5554.54
...	nn D	49.0123	5556.74	−17	5556.57	...	....	....	....	....	....	56.80	+47	5557.27
...	nn D	49.1890	5566.74	−18	5566.56	...	nn D	57.1464	5567.88	−18	5567.70	67.13	+47	5567.60
...	n B	49.2732	5571.53	−19	5571.34	...	....	....	....	....	....	71.57	+47	5572.04
2	n B	49.4380	5580.96	−21	5580.75	3	n B	57.3880	5581.64	−21	5581.43	81.09	+47	5581.56
1-2	n D	49.4907	5583.99	−22	5583.77	1	n D	57.4430	5584.80	−21	5584.59	84.18	+47	5584.65
1-2	n D	49.5880	5589.61	−23	5589.38	...	nn D	57.5315	5589.89	−23	5589.66	89.52	+47	5589.99
...	n B	49.6457	5592.95	−23	5592.72	1	n B	57.5850	5592.98	−23	5592.75	92.74	+47	5593.21
...	n B	49.7184	5597.17	−24	5596.93	2	n B	57.6759	5598.24	−24	5598.00	97.47	+47	5597.94
...	....	....	....	....	....	Max	B	57.8240	5606.87	−26	5606.61	06.38	+47	5606.85
2	D	50.1167	5620.55	−28	5620.27	4	D	58.0629	5620.90	−28	5620.62	20.45	+47	5620.92
3	D	50.1994	5625.46	−29	5625.17	...	....	....	....	....	....	25.40	+47	5625.87
	from	50.2330	5627.50	−30	5627.20	...	....	....	....	....	....	27.43	+47	5627.9
B						6	w B	58.2215	5630.31	−29	5630.02	29.79	+47	5630.26
	to	50.3020	5631.61	−30	5631.31	...	....	....	....	....	....	31.54	+47	5632.0
8	D	50.3392	5633.81	−31	5633.50	6	n D	58.2827	5633.95	−30	5633.65	33.58	+47	5634.05
Head		50.3828	5636.42	−31	5636.11	Head		58.3305	5636.81	−30	5636.51	36.31	+47	5636.78
...	nn D	50.5230	5644.85	−33	5644.52	...	....	....	....	....	....	44.75	+47	5645.22
1	n D	50.6050	5649.82	−34	5649.48	...	....	....	....	....	....	49.71	+47	5650.18
B	from	50.6230	5650.93	−34	5650.59	...	....	....	....	....	....	50.82	+47	5651.3
	to	50.7215	5656.89	−35	5656.54	...	....	....	....	....	....	56.77	+47	5657.2
1-2	n D	50.7539	5658.87	−35	5658.52	...	....	....	....	....	....	58.75	+48	5658.23
...	n D	50.9637	5671.74	−37	5671.37	1	n D	58.9019	5671.44	−35	5671.09	71.23	+48	5671.71
1	B	51.0070	5674.41	−38	5674.03	...	....	....	....	....	....	74.26	+48	5674.74
2	D	51.0470	5676.88	−38	5676.50	1	n D	59.0010	5677.55	−36	5677.19	76.85	+48	5677.33
1-2	n D	51.2199	5687.62	−40	5687.22	...	....	....	....	....	....	87.45	+48	5687.93
...	nn B	51.3075	5693.09	−41	5692.68	...	....	....	....	....	....	92.91	+48	5693.39
...	....	....	....	....	....	...	wn B	59.2745	5694.53	−37	5694.16	93.93	+48	5694.41
...	....	....	....	....	....	1	B	59.3538	5699.50	−38	5699.12	98.89	+48	5699.37
...	....	....	....	....	....	2	nn B	59.4707	5706.85	−39	5706.46	06.23	+48	5706.71
2	n D	51.5520	5708.50	−43	5708.07	1	n D	59.5077	5709.19	−39	5708.80	08.44	+48	5708.92
...	nn B	51.6852	5716.97	−44	5716.53	Max	B	59.6410	5717.65	−40	5717.25	16.89	+48	5717.37

290 *SCHJELLERUP—Continued*

Plate G 366						Plate G 370						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
2	n B	51.7968	5724.11	−46	5723.65	Max	B	59.7514	5724.68	−41	5724.27	23.96	+48	5724.44
...	nn D	51.9112	5731.46	−47	5730.99	...	....	....	....	....	....	31.22	+48	5731.70
...	....	....	....	....	....	1-2	n D	59.8747	5732.60	−42	5732.18	31.95	+48	5732.43
...	....	....	....	....	....	B {	from	59.9020	5734.40	−42	5733.98	33.75	+48	5734.2
...	....	....	....	....	....		to	60.0390	5743.30	−43	5742.87	42.64	+48	5743.1
...	nn D	52.1065	5744.10	−49	5743.61	...	....	....	....	....	....	43.84	+48	5744.32
...	nn D	52.2212	5751.60	−50	5751.10	1	n D	60.1725	5751.89	−44	5751.45	51.22	+48	5751.70
2-3	wn B	52.3143	5757.70	−50	5757.20	...	w B	60.2697	5758.25	−45	5757.80	57.57	+48	5758.05
...	wn D	52.4020	5763.48	−50	5762.98	...	....	....	....	....	....	63.21	+48	5763.69
...	....	....	....	....	....	2	n B	60.4330	5769.00	−46	5768.54	68.31	+48	5768.79
1	n D	52.5380	5772.49	−50	5771.99	1	n D	60.4740	5771.71	−46	5771.25	71.62	+48	5772.10
...	....	....	....	....	....	2	n B	60.6135	5780.98	−46	5780.52	80.29	+48	5780.77
...	....	....	....	....	....	End	....	61.9530	5873.40	−50	5872.90	72.67	+48	5873.

318 *BIRMINGHAM = DM.* 68°617

Plate G 276 1899, January 15, G.M.T. 16h4. Hour angle, E 4h4 Star good; comparison fair						Plate G 393 1900, March 31, G.M.T. 18h±. Hour angle, W 2h2 Star excellent; comparison good						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
...	nn D	64.0863	4389.68	+ 9	4389.77	...	nn D	56.1606	4390.45	−47	4389.98	89.88	+15	4390.03
...	nn D	63.7893	4395.06	+ 8	4395.14	...	wn D	56.4269	4395.37	−48	4394.89	95.02	+15	4395.17
...	wn D	63.4673	4400.94	+ 7	4401.01	...	nn D	56.7340	4401.10	−50	4400.60	00.87	+15	4401.02
2	n B	63.3981	4402.21	+ 6	4402.27	5	n B	56.8282	4402.86	−50	4402.36	02.32	+15	4402.47
2-3	nn D	63.2537	4404.86	+ 5	4404.91	...	wn D	56.9736	4405.59	−51	4405.08	05.00	+15	4405.15
...	wn D	63.0670	4408.30	+ 4	4408.34	...	....	....	....	....	....	08.37	+15	4408.52
...	....	....	....	....	....	B {	from	57.2130	4410.10	−52	4409.58	09.55	+15	4409.70
...	....	....	....	....	....		to	57.4510	4414.60	−53	4414.07	14.04	+15	4414.2
2-3	n D	62.7075	4415.01	+ 3	4415.04	...	nn D	57.4915	4415.41	−53	4414.88	14.96	+15	4415.11
2	n D	62.1355	4425.81	+ 1	4425.82	1	n D	58.0494	4426.15	−55	4425.60	25.71	+15	4425.86
3	n D	62.0466	4427.50	0	4427.50	2	n D	58.1354	4428.66	−55	4428.11	27.81	+15	4427.96
...	nn D	61.9070	4430.16	0	4430.16	1-2	n D	58.2797	4430.63	−55	4430.08	30.12	+15	4430.27
...	....	....	....	....	....	B {	from	58.3200	4431.40	−56	4430.84	30.81	+15	4431.0
...	....	....	....	....	....		to	58.4530	4434.00	−56	4433.44	33.41	+15	4433.6
...	....	....	....	....	....	Max	B	58.3650	4432.29	−56	4431.73	31.70	+15	4431.85
1	n D	61.7190	4433.80	− 1	4433.79	...	nn D	58.4726	4434.40	−56	4433.84	33.81	+15	4433.96
...	wn D	61.6256	4435.57	− 1	4435.56	5	nn D	58.5374	4435.67	−56	4435.11	35.34	+15	4435.49
2	n D	61.4923	4438.15	− 2	4438.13	1	nn D	58.6850	4438.58	−56	4438.02	38.08	+15	4438.23
...	B	61.4420	4439.10	− 2	4439.08	5-6	n B	58.7336	4439.54	−56	4438.98	38.95	+15	4439.10
1-2	D	61.1761	4444.30	− 3	4444.27	...	....	....	....	....	....	44.30	+15	4444.45
...	....	....	....	....	....	B {	from	59.0300	4445.43	−57	4444.86	44.83	+15	4445.0
...	....	....	....	....	....		to	59.1260	4447.30	−57	4446.73	46.70	+15	4446.9
...	wn D	61.0220	4447.31	− 4	4447.27	2	n D	59.1557	4447.94	−57	4447.37	47.32	+15	4447.47
2	n B	60.9604	4448.52	− 4	4448.48	6	n B	59.2095	4449.01	−57	4448.44	48.46	+15	4448.61
...	wn D	60.8905	4449.90	− 4	4449.86	...	wn D	59.2829	4450.49	−57	4449.92	49.89	+15	4450.04
2	n D	60.7160	4453.34	− 5	4453.29	1	n D	59.4432	4453.71	−58	4453.13	53.21	+15	4453.36
...	nn D	60.6218	4455.21	− 5	4455.16	1	n D	59.5472	4455.81	−58	4455.23	55.20	+15	4455.35
...	nn D	60.3790	4460.00	− 6	4459.94	...	....	....	....	....	....	59.97	+15	4460.12
...	wn D	60.2858	4461.91	− 6	4461.85	3	n D	59.8792	4462.56	−58	4461.98	61.92	+15	4462.07
4	n B	60.1904	4463.82	− 7	4463.75	8	wn B	59.9664	4464.34	−58	4463.76	63.76	+15	4463.91
...	....	....	....	....	....	1	n D	60.0417	4465.89	−58	4465.31	65.28	+15	4465.43
1	nn D	59.8040	4471.62	− 8	4471.54	...	....	....	....	....	....	71.57	+15	4471.72
...	....	....	....	....	....	B {	from	60.3810	4472.90	−58	4472.32	72.29	+15	4472.4
...	....	....	....	....	....		to	60.4880	4474.90	−57	4474.33	74.30	+15	4474.5
1	n D	59.5902	4475.98	− 8	4475.90	...	....	....	....	....	....	75.93	+15	4476.08

318 *BIRMINGHAM — Continued*

Plate G 276						Plate G 393						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
...	....	....	....	....	....	1	nn D	60.7596	4480.77	−57	4480.20	80.27	+15	4480.42
2–3	nn D	59.2813	4482.32	− 9	4482.23	2	nn D	60.8585	4482.85	−57	4482.28	82.26	+15	4482.41
...	....	....	....	....	....	2	n B	60.9177	4484.09	−57	4483.52	83.49	+15	4483.64
...	....	....	....	....	....	1-2	n B	61.0422	4486.71	−56	4486.15	86.12	+15	4486.27
...	nn D	59.0411	4487.28	− 9	4487.19	2	nn D	61.0989	4487.91	−56	4487.35	87.27	+15	4487.42
3	n D	58.9247	4489.70	−10	4489.60	3	n D	61.2096	4490.26	−56	4489.70	89.65	+15	4489.80
...	wn D	58.5813	4496.89	−10	4496.79	...	wn D	61.5444	4497.40	−55	4496.85	96.82	−15	4496.97
2–3	nn D	58.3523	4501.73	−10	4501.63	...	nn D	61.7749	4502.35	−54	4501.81	01.72	−15	4501.87
B	from	58.3210	4502.40	−10	4502.30	B	from	61.8060	4503.00	−54	4502.46	02.38	−15	4502.5
	to	58.1400	4506.20	−10	4506.10		to	61.9770	4506.70	−53	4506.17	06.14	−15	4506.3
Max	B	58.2340	4504.20	−10	4504.10	...	....	....	....	....	....	04.13	−15	4504.3
2	n D	58.1063	4506.96	−10	4506.86	3	n D	62.0142	4507.53	−53	4507.00	06.93	−15	4507.08
...	....	....	....	....	....	6	n B	62.0837	4509.05	−53	4508.52	08.49	−15	4508.64
1	nn D	57.9765	4509.10	− 9	4509.01	1	n D	62.1424	4510.32	−52	4509.80	09.41	−15	4509.56
...	....	....	....	....	....	2	nn D	62.2669	4513.05	−51	4512.52	12.49	−15	4512.64
4	wn D	57.5856	4518.15	− 8	4518.07	2	n D	62.5267	4518.75	−50	4518.25	18.16	−15	4518.31
...	....	....	....	....	....	3	wn B	62.6753	4522.04	−49	4521.55	21.52	−15	4521.67
5	wn D	57.3650	4522.94	− 8	4522.86	4	n D	62.7391	4523.45	−49	4522.96	22.91	−15	4523.06
1	nn D	57.1090	4528.54	− 7	4528.47	...	....	....	....	....	....	28.50	−15	4528.65
1	nn D	56.9826	4531.32	− 6	4531.26	...	nn D	63.1029	4531.57	−47	4531.10	31.18	−15	4531.43
...	nn D	56.7810	4535.78	− 6	4535.72	...	nn D	63.3047	4536.11	−46	4535.65	35.69	−15	4535.84
...	....	....	....	....	....	B	from	63.3420	4536.90	−46	4536.44	36.41	−15	4536.6
3	wn B	56.7148	4537.25	− 5	4537.20			....	....	....	....	37.23	−15	4537.38
2	n B	56.6471	4538.76	− 5	4538.71			....	....	....	....	38.74	−15	4538.89
...	....	....	....	....	....		to	63.4790	4540.00	−45	4539.55	39.52	−15	4539.7
...	nn D	56.5708	4540.46	− 5	4540.41	4	n D	63.5097	4540.76	−45	4540.31	40.36	−15	4540.51
...	nn D	56.3491	4545.43	− 3	4545.40	...	wn D	63.7440	4546.10	−44	4545.66	45.53	−15	4545.68
1	nn D	56.2963	4546.61	− 3	4546.58	...	....	....	....	....	....	46.61	−15	4546.76
...	....	....	....	....	....	4	n B	63.8277	4548.02	−43	4547.59	47.56	−15	4547.71
...	wn D	56.1758	4549.33	− 2	4549.31	...	nn D	63.8949	4549.56	−43	4549.13	49.22	−15	4549.37
D	from	56.0490	4552.20	− 1	4552.19	D	from	64.0240	4552.54	−41	4552.13	52.16	−15	4552.3
	to	55.9160	4555.20	0	4555.20		to	64.1530	4555.50	−41	4555.09	55.15	−15	4555.3
Max	D	55.9955	4553.41	− 1	4553.40	...	....	....	....	....	....	53.43	−15	4553.58
B	from	55.9160	4555.20	0	4555.20	B	from	64.1530	4555.50	−41	4555.09	55.15	−15	4555.3
	to	55.7430	4559.20	+ 1	4559.21		to	64.3290	4559.60	−39	4559.21	59.21	−15	4559.4
...	nn D	55.6930	4560.30	+ 1	4560.31	1	nn D	64.2470	4557.70	−40	4557.30	57.27	−15	4557.42
4	nn D	55.5614	4563.34	+ 2	4563.36	5	nn D	64.3721	4560.61	−39	4560.22	60.27	−15	4560.42
2	nn D	55.4598	4565.68	+ 2	4565.70	2	n D	64.5082	4563.79	−38	4563.41	63.39	−15	4563.54
B	from	55.4400	4566.10	+ 3	4566.13	1	n D	64.5934	4565.79	−37	4565.42	65.56	−15	4565.71
	to	55.2430	4570.70	+ 4	4570.74	B	from	64.6160	4566.30	−37	4565.93	66.03	−15	4566.2
D	from	55.2430	4570.70	+ 4	4570.74		to	64.7900	4570.40	−36	4570.04	70.39	−15	4570.5
		....	....	....	....	...	....	....	....	....	....	70.77	−15	4570.9
	to	54.9870	4576.70	+ 5	4576.75	...	wn D	64.8579	4572.02	−35	4571.67	71.64	−15	4571.79
...	....	....	....	....	....	...	nn D	64.9976	4575.33	−35	4574.98	74.95	−15	4575.10
1	nn D	54.9575	4577.37	+ 6	4577.43	...	....	....	....	....	....	76.78	−15	4576.9
1	nn D	54.8243	4580.50	+ 7	4580.57	...	nn D	65.0907	4577.55	−34	4577.21	77.32	−15	4577.47
...	....	....	....	....	....	...	nn D	65.2140	4580.50	−33	4580.17	80.37	−15	4580.52
...	....	....	....	....	....	1	nn D	65.3089	4582.77	−32	4582.45	82.42	−15	4582.57
...	....	....	....	....	....	1	n D	65.4024	4585.01	−31	4584.70	84.67	−15	4584.82
...	....	....	....	....	....	1	nn D	65.4560	4586.30	−31	4585.99	85.96	−15	4586.1
1	nn D	54.3836	4590.94	+ 9	4591.03	1–2	nn D	65.6686	4591.45	−29	4591.16	91.10	−15	4591.25
2	nn D	54.2548	4594.02	+10	4594.12	...	....	....	....	....	....	94.15	−15	4594.30
...	....	....	....	....	....	5	n B	65.8661	4596.26	−28	4595.98	95.95	−15	4596.10
...	....	....	....	....	....	2	n D	65.9276	4597.76	−27	4597.49	97.46	−15	4597.61
3	nn D	53.9766	4600.71	+11	4600.82	3	n D	66.0637	4600.36	−26	4600.10	00.46	−15	4600.61
D	from	53.7840	4605.40	+12	4605.52	...	....	....	....	....	....	05.55	−15	4605.7
	to	53.6760	4608.00	+13	4608.13	...	....	....	....	....	....	08.16	−15	4608.3
10	wn D	53.7343	4606.59	+12	4606.71	10	D	66.3012	4606.95	−25	4606.70	06.71	−15	4606.86
B	from	53.6760	4608.00	+13	4608.13	...	....	....	....	....	....	08.16	−15	4608.3
		....	....	....	....	2	n B	66.3959	4609.31	−24	4609.07	09.04	−15	4609.19
		....	....	....	....	1	nn D	66.4517	4610.69	−24	4610.45	10.42	−15	4610.57
		....	....	....	....	1	n B	66.5241	4612.50	−23	4612.27	12.24	−15	4612.39
	to	53.4800	4612.80	+13	4612.93	...	....	....	....	....	....	12.96	−15	4613.1
2	n D	53.4613	4613.27	+14	4613.41	2–3	n D	66.5834	4613.97	−22	4613.75	13.58	−15	4613.73

318 *BIRMINGHAM—Continued*

Plate G 276						Plate G 363						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
5	n B	53.3983	4614.81	+14	4614.95	6	n B	66.6355	4615.28	+22	4615.06	15.00	+15	4615.15
3-4	n D	53.3478	4616.06	+14	4616.20	4	n D	66.6895	4616.63	+22	4616.41	16.31	+15	4616.46
8	n B	53.2801	4617.73	+14	4617.87	7	n B	66.7479	4618.09	+21	4617.88	17.88	+15	4618.03
6	n D	53.2061	4619.56	+15	4619.71	6	n D	66.8206	4619.92	+21	4619.71	19.71	+15	4619.86
5	n B	53.1385	4621.23	+15	4621.38	...	....	....	....	....	....	21.41	+15	4621.56
2-3	nn D	53.0779	4622.74	+15	4622.89	2	nn D	66.9471	4623.11	+20	4622.91	22.90	+15	4623.05
...	....	....	....	....	....	8	n D	67.2030	4629.60	+18	4629.42	29.39	+15	4629.54
...	....	....	....	....	....	2	n B	67.2736	4631.40	+18	4631.22	31.19	+15	4631.34
3	n B	52.4395	4638.77	+18	4638.95	3-4	n B	67.5707	4639.28	+16	4639.12	39.04	+15	4639.19
6	D	52.3870	4640.10	+18	4640.28	6	n D	67.6277	4640.49	+16	4640.33	40.31	+15	4640.46
...	....	....	....	....	....	B	from	67.6610	4641.36	+15	4641.21	41.18	+15	4641.3
4	wn B	52.3214	4641.77	+18	4641.95			....	....	....	....	42.01	+15	4642.16
							to	67.7680	4644.10	+14	4643.96	43.93	+15	4644.1
Comp	lete a	bsorption												
						D	from	71.0540	4734.12	+ 4	4734.16	34.13	+16	4734.3
10	w D	48.8333	4735.84	+27	4736.11			....	....	....	....	36.14	+16	4736.30
...	....	....	....	....	....		to	71.1830	4737.80	+ 4	4737.84	37.81	+16	4738.0
...	....	....	....	....	....	B	from	71.1830	4737.80	+ 4	4737.84	37.81	+16	4738.0
5-6	n B	48.7468	4738.31	+27	4738.58		4 n B	71.2102	4738.64	+ 4	4738.68	38.63	+16	4738.79
1	n D	48.6991	4739.68	+27	4739.95			....	....	....	....	39.98	+16	4740.14
...	....	....	....	....	....		to	71.3100	4741.50	+ 4	4741.54	41.51	+16	4741.7
10	D	48.5694	4743.41	+27	4743.68	10	w D	71.3881	4743.83	+ 5	4743.88	43.78	+16	4743.94
...	....	....	....	....	....	L'ts	from	71.3100	4741.50	+ 4	4741.54	41.51	+16	4741.7
...	....	....	....	....	....		to	71.4440	4745.40	+ 5	4745.45	45.42	+16	4745.6
Head	....	48.5081	4745.18	+27	4745.45	Head	....	71.4469	4745.55	+ 5	4745.60	45.53	+16	4745.69
4	n B	48.4736	4746.17	+27	4746.44	...	w B	71.4866	4746.72	+ 6	4746.78	46.61	+16	4746.77
...	nn D	48.3766	4748.98	+27	4749.25	...	nn D	71.5777	4749.39	+ 6	4749.45	49.34	+16	4749.50
...	nn D	48.0661	4758.04	+27	4758.31	4	n D	71.8869	4758.54	+ 7	4758.61	58.46	+16	4758.62
...	nn D	47.7955	4766.01	+27	4766.28	...	....	....	....	....	....	66.31	+16	4766.47
...	nn D	47.5756	4772.54	+27	4772.81	2-3	nn D	72.3619	4772.79	+ 9	4772.88	72.85	+16	4773.01
...	....	....	....	....	....	2	n B	73.5757	4810.30	+12	4810.42	10.39	+16	4810.54
...	nn D	46.2956	4811.58	+26	4811.84	...	....	....	....	....	....	11.87	+16	4812.03
...	....	....	....	....	....	2	n B	73.6842	4813.73	+12	4813.85	13.82	+16	4813.98
3	n D	46.1761	4815.32	+26	4815.58	4	n D	73.7416	4815.23	+11	4815.34	15.46	+16	4815.62
3	n D	45.9228	4823.29	+26	4823.55	3	nn D	73.9984	4823.74	+11	4823.85	23.70	+16	4823.86
3	n D	45.7775	4827.89	+25	4828.14	3	nn D	74.1264	4827.85	+10	4827.95	28.05	+16	4828.21
3	n B	45.7108	4830.02	+25	4830.27	...	....	....	....	....	....	30.30	+16	4830.46
3	n D	45.6461	4832.08	+25	4832.33	6	n D	74.2666	4832.37	+10	4832.47	32.40	+16	4832.56
1	D	45.3000	4843.19	+24	4843.43	...	....	....	....	....	....	43.46	+16	4843.62
...	nn D	44.9356	4855.05	+23	4855.28	...	....	....	....	....	....	55.31	+16	4855.47
...	....	....	....	....	....	1	n B	75.0324	4857.49	+ 6	4857.55	57.52	+16	4857.68
...	nn D	44.4424	4871.35	+21	4871.56	...	D	75.4577	4871.75	+ 3	4871.78	71.67	+16	4871.83
...	nn D	44.3110	4875.74	+21	4875.95	...	....	....	....	....	....	75.98	+16	4876.14
4	n D	44.1501	4881.15	+20	4881.35	2	n D	75.7421	4881.41	+ 1	4881.42	81.39	+16	4881.55
...	....	....	....	....	....	2	nn D	75.8584	4885.39	0	4885.39	85.36	+16	4885.52
2-3	n D	43.5808	4900.54	+17	4900.71	...	nn D	76.3069	4900.89	− 3	4900.86	00.79	+16	4900.95
...	wn D	42.9971	4920.85	+14	4920.99	...	nn D	76.8594	4920.35	− 8	4920.27	20.62	+16	4920.78
1	nn D	42.8823	4924.91	+14	4925.05	...	....	....	....	....	....	.....	....	....
1	D	42.6213	4934.16	+12	4934.28	...	....	....	....	....	....	.....	....	....
1-2	n D	41.9581	4958.13	+ 8	4958.21	...	....	....	....	....	....	.....	....	....
...	nn D	40.8214	5000.66	+ 1	5000.67	...	....	....	....	....	....	.....	....	....

318 *BIRMINGHAM*

PLATE G 253 1898, December 26, G.M.T. 21h7 Hour angle, E 0h5 Star good; comparison good						PLATE G 284 1899, January 20, G.M.T. 17h8 Hour angle E 2h7 Star good; comparison fair						PLATE G 379 1900, January 25, G.M.T. 20h7 Hour angle, W 0h4 Star fair; comparison good						MEAN WAVE-LENGTH		
In-ten-sity	Char-acter	Mean Scale Read-ing	Wave-Length by For-mula	Cor. from Curve	Wave-Length	In-ten-sity	Char-acter	Mean Scale Read-ing	Wave-Length by Form.	Cor. from Curve	Wave-Length	In-ten-sity	Char-acter	Mean Scale Read-ing	Wave-Length by Form.	Cor. from Curve	Wave-Length	Uncor. for Velocity	Cor. for V	Cor. for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
Spec	begin	45.779	5165.9	+24	5166.1	Begi	ns	44.895	68.30	+22	68.52	....	....	....	....	....	....	68.63	+17	5168.8
....	n B	45.8612	5169.92	+24	5170.16	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
....	wn D	45.9300	5172.64	+24	5172.88	4	n D	44.7710	73.14	+21	73.35	....	....	....	....	....	....	73.46	+17	5173.63
Max	B	46.0148	5176.00	+23	5176.23	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
....	wn D	46.1881	5182.91	+23	5183.14	....	nn D	44.5124	83.26	+18	83.44	....	....	....	....	....	....	83.55	+17	5183.72
B	from	46.2390	5184.90	+22	5185.12	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
						1	n D	44.3792	88.51	+16	88.67	....	....	....	....	....	....	88.78	+17	5188.95
	to	46.3930	5191.10	+22	5191.32	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
....	n D	46.4345	5192.82	+21	5193.03	6	wn D	44.2657	93.00	+15	93.15	....	....	....	....	....	....	93.26	+17	5193.43
B	from	46.4710	5194.30	+21	5194.51	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
						1	nn D	44.0207	02.76	+11	02.87	....	....	....	....	....	....	02.98	+17	5203.15
	to	46.7090	5204.00	+20	5204.20	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
D	from	46.7250	5204.60	+20	5204.80	D	from	43.9770	04.50	+11	04.61	....	....	....	....	....	....	04.72	+17	5204.9
							4 D	43.9520	05.52	+10	05.62	....	....	....	....	....	....	05.73	+17	5205.90
	to	46.8830	5211.10	+19	5211.29		to	43.8070	11.30	+ 8	11.38	....	....	....	....	....	....	11.49	+17	5211.7
3-4	n B	46.9365	5213.28	+19	5213.47	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1	n D	47.0072	5216.20	+18	5216.38	2-3	nn D	43.6873	16.20	+ 5	16.25	....	....	....	....	....	....	16.36	+17	5216.53
B	from	47.0260	5217.00	+18	5217.18	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	to	47.1980	5224.10	+16	5224.26	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
4	n D	47.2453	5226.07	+16	5226.23	8	wn D	43.4450	26.07	− 2	26.05	....	....	....	....	....	....	26.16	+17	5226.33
	n B	47.3310	5229.65	+16	5229.81	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
....	nn D	47.4150	5233.17	+15	5233.32	2-3	n D	43.2513	34.03	− 9	33.94	....	....	....	....	....	....	34.05	+17	5234.22
....	wn B	47.4868	5236.19	+15	5236.34	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
....	....	....	....	....	....	2	n D	43.1179	39.54	−13	39.41	....	....	....	....	....	....	39.52	+17	5239.69
1	nn D	47.7416	5246.96	+14	5247.10	3	n D	42.9323	47.27	−19	47.08	....	....	....	....	....	....	47.17	+17	5247.34
2	nn D	47.8344	5250.91	+13	5251.04	3	n D	42.8385	51.19	−20	50.99	....	....	....	....	....	....	51.10	+18	5251.28
....	....	....	....	....	....	2	nn D	42.7353	55.52	−21	55.31	....	....	....	....	....	....	55.42	+18	5255 60
5	n D	48.2738	5269.81	+10	5269.91	5	D	42.3943	69.96	−23	69.73	....	....	....	....	....	....	69.84	+18	5270.02
....	nn B	48.4968	5279.53	+ 8	5279.61	2	n B	42.1687	79.62	−23	79.39	....	....	....	....	....	....	79.50	+18	5279.68
6	wn D	48.8945	5297.08	+ 5	5297.13	3	n D	41.7517	97.70	−22	97.48	....	....	....	....	....	....	97.59	+18	5297.77
....	....	....	....	....	....	1	nn D	41.6502	02.15	−20	01.95	....	....	....	....	....	....	02.06	+18	5302.24
....	wn B	49.0576	5304.36	+ 5	5304.41	2-3	nn B	41.5909	04.75	−20	04.55	....	....	....	....	....	....	04.66	+18	5304.84
....	nn D	49.1196	5307.15	+ 4	5307.19	2	nn D	41.5407	06.97	−19	06.78	....	....	....	....	....	....	06.89	+18	5307.07
3	n B	49.2443	5312.75	+ 4	5312.79	3	n B	41.4072	12.87	−18	12.69	....	....	....	....	....	....	12.80	+18	5312.98
3	nn D	49.2882	5314.74	+ 4	5314.78	2	n D	41.3590	15.01	−18	14.83	....	....	....	....	....	....	14.94	+18	5315.12
6	wn B	49.3476	5317.43	+ 4	5317.47	6	n B	41.3043	17.44	−16	17.28	....	....	....	....	....	....	17.39	+18	5317.57
2	n D	49.4102	5320.26	+ 4	5320.30	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
3	n D	49.5865	5328.30	+ 4	5328.34	5	D	41.0564	28.53	−12	28.41	....	....	....	....	....	....	28.52	+18	5328.70
5	n B	49.7205	5334.45	+ 4	5334.49	Max	B	40.9317	34.14	−11	34.03	....	....	....	....	....	....	34.14	+18	5334.32
1	n D	49.7540	53 5.99	+ 4	5336.03	1	nn D	40.8765	36.64	−10	36.54	....	....	....	....	....	....	36.65	+18	5336.83
....	....	....	....	....	....	3	B	40.8279	38.84	− 8	38.76	....	....	....	....	....	....	38.87	+18	5339.05
2	nn D	49.8545	5340.64	+ 4	5340.68	4	n D	40.7797	41.03	− 7	40.96	....	....	....	....	....	....	41.07	+18	5341.25
....	wn D	50.0278	5348.68	+ 5	5348.73	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
B	from	50.0720	5350.70	+ 5	5350.75	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	to	50.2820	5360.60	+ 6	5360.66	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
....	nn D	50.3110	5362.10	+ 6	5362.16	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1	nn D	50.3935	5365.85	+ 7	5365.92	2	n D	40.2327	66.17	+ 1	66.18	....	....	....	....	....	....	66.29	+18	5366.47
....	....	....	....	....	....	3	n B	40.1854	68.37	+ 2	68.39	....	....	....	....	....	....	68.50	+18	5368.68
6	D	50.5040	5371.09	+ 8	5371.17	6	D	40.1225	71.30	+ 3	71.33	6	D	52.9072	71.31	− 3	71.28	71.31	+18	5371.49
6	n B	50.5655	5374.02	+ 8	5374.10	8	n B	40.0522	74.59	+ 4	74.63	....	....	....	....	....	....	74.74	+18	5374.92
2	n D	50.6173	5376.49	+ 9	5376.58	2	n D	40.0004	77.02	+ 5	77.07	....	....	....	....	....	....	77.18	+18	5377.36
....	wn B	50.6815	5379.56	+ 9	5379.65	6-8	nn B	39.9500	79.38	+ 5	79.43	....	....	....	....	....	....	79.54	+18	5379.72
2	nn D	50.7893	5384.73	+10	5384.83	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
4	nn B	50.9423	5392.12	+12	5392.24	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
4	wn D	51.0305	5396.39	+13	5396.52	....	nn D	39.5888	96.49	+ 9	96.58	....	....	....	....	....	....	96.63	+18	5396.81
Max	B	51.1425	5401.85	+14	5402.01	Max	B	39.4460	03.32	+11	03.43	....	....	....	....	....	....	03.54	+18	5403.72
2	nn D	51.2923	5409.18	+16	5409.34	1	n D	39.3079	09.97	+11	10.08	....	....	....	....	....	....	10.19	+18	5410.37
....	....	....	....	....	....	1	B	39.2649	12.05	+12	12.17	....	....	....	....	....	....	12.28	+18	5412.46
1	nn D	51.3746	5413.23	+17	5413.40	1	n D	39.2348	13.50	+12	13.62	....	....	....	....	....	....	13.73	+18	5413.91
8	n B	51.4313	5416.03	+18	5416.21		w B	39.1788	16.22	+13	16.35	....	....	....	....	....	....	16.46	+18	5416.64
3	nn D	51.5002	5419.44	+18	5419.62	2-3	n D	39.1062	19.80	+13	19.93	....	....	....	....	....	....	20.04	+18	5420.22
....	....	....	....	....	....	6	B	39.0527	22.36	+13	22.49	....	....	....	....	....	....	22.60	+18	5422.78
1	nn D	51.6013	5424.46	+19	5424.65	1	nn D	39.0110	24.40	+13	24.53	....	....	....	....	....	....	24.64	+18	5424.82
....	....	....	....	....	....	5	n B	38.9732	26.24	+14	26.38	....	....	....	....	....	....	26.49	+18	5426.67
4	n D	51.6971	5429.25	+20	5429.45	4	n D	38.9027	29.70	+14	29.84	....	....	....	....	....	....	29.95	+18	5430.13
....	....	....	....	....	....	2	B	38.8620	31.70	+14	31.84	....	....	....	....	....	....	31.95	+18	5432.13
1	n D	51.7923	5434.01	+20	5434.21	2	n D	38.8245	33.55	+15	33.70	....	....	....	....	....	....	33.81	+18	5433.99
1	nn D	51.8591	5437.37	+20	5437.57	1	nn D	38.7418	37.63	+15	37.78	....	....	....	....	....	....	37.89	+18	5438.07
B	from	51.8920	5439.01	+21	5439.22	B	from	38.7180	38.80	+15	38.95	....	....	....	....	....	....	39.06	+18	5439.2
	to	52.0100	5445.00	+22	5445.22		to	38.5890	45.20	+16	45.36	....	....	....	....	....	....	45.47	+18	5445.7
9	n D	52.0468	5446.85	+22	5447.07	6	n D	38.5452	47.38	+16	47.54	4	n D	54.4493	47.54	−12	47.42	47.48	+18	5447.66
5	n B	52.1056	5449.84	+22	5450.06	5	B	38.4880	50.24	+16	50.40	....	nn B	54.5060	50.43	−12	50.31	50.36	+18	5450.54
3	n B	52.1610	5452.66	+23	5452.89	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
2	n D	52.2223	5455.79	+23	5456.02	2	n D	38.3734	55.98	+16	56.14	....	....	....	....	....	....	56.25	+18	5456.43
....	....	....	....	....	....	1	B	38.3240	58.46	+17	58.63	....	....	....	....	....	....	58.74	+18	5458.92
2	n D	52.2985	5459.70	+23	5459.93	2	n D	38.2898	60.18	+17	60.35	....	nn D	54.7115	61.29	−12	61.17	60.76	+18	5460.94
B	from	52.3180	5460.70	+23	5460.93	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
						2	B	38.2509	62.14	+17	62.31	....	....	....	....	....	....	62.42	+18	5462.60
	to	52.4030	5465.10	+24	5465.34	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
D	from	52.4030	5465.10	+24	5465.34	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	mid	52.4533	5467.66	+24	5467.90	2	n D	38.1628	66.60	+17	66.77	....	....	....	....	....	....	66.88	+18	5467.06
	to	52.4920	5469.70	+24	5469.94	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
8	n B	52.5188	5471.05	+24	5471.29	6	B	38.0615	71.74	+17	71.91	....	nn B	54.9223	71.92	−11	71.81	71.86	+18	5472.04
1-2	n D	52.5617	5473.27	+25	5473.52	2	n D	38.0189	73.91	+18	74.09	....	....	....	....	....	....	74.20	+18	5474.38
....	....	....	....	....	....	2	n D	37.9567	77.09	+18	77.27	....	....	....	....	....	....	77.38	+18	5477.56
2-3	n B	52.6843	5479.65	+25	5479.90	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

318 *BIRMINGHAM* = *DM* + 68°617 — *Continued*

Plate G 253						Plate G 284						Plate G 379						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Form.	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Form.	Cor. from Curve	Wave-Length	Uncor. for Velocity	Cor. for V	Cor. for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
1	n D	52.7281	5481.94	+25	5481.19	1	nn D	37.8495	82.58	+18	82.76							82.87	+18	5483.05
1	n B	52.7995	5485.68	+26	5485.64															
2	n D	53.0162	5497.10	+26	5497.36	3	n D	37.5652	97.26	+19	97.45							97.56	+18	5497.74
2	n D	53.0931	5501.17	+26	5501.43	1	nn D	37.4788	01.76	+19	01.95							02.06	+18	5502.24
						0-1	nn D	37.3865	06.58	+19	06.77							06.88	+18	5507.06
5	n B	53.2206	5507.96	+26	5508.22															
2	nn D	53.2798	5511.13	+26	5511.39															
B	from	53.3060	5513.10	+26	5513.36															
B	Max	53.4642	5519.97	+26	5520.23															
B	to	53.4870	5522.30	+26	5522.56															
						2	n D	37.0588	23.87	+19	24.06							24.17	+18	5524.35
						1	nn D	36.9698	28.61	+19	28.80							28.91	+18	5529.09
2	nn B	53.6433	5530.75	+26	5531.01															
						1	nn D	36.8800	33.41	+19	33.60							33.71	+18	5533.89
7	n D	53.7900	5538.36	+26	5538.62	10	w D	36.7890	38.29	+19	38.48	7	D	56.1868	39.60	0	39.60	39.04	+18	5539.22
						B	from	36.7350	41.20	+19	41.39							41.50	+18	5541.7
9	n B	53.8583	5542.51	+25	5542.76	B														
1	nn D	53.9050	5545.10	+25	5545.35	B														
						B	to	36.6330	46.70	+19	46.89							47.00	+18	5547.2
1	n D	53.9591	5548.06	+25	5548.31	1-2	n D	36.6122	47.83	+19	48.02							48.13	+18	5548.31
1	n D	54.0165	5551.23	+25	5551.48															
						1	n D	36.5347	52.04	+19	52.23							52.34	+19	5552.53
2	n B	54.0493	5553.05	+25	5553.30	2	n B	36.5012	53.86	+19	54.05							54.16	+19	5554.35
2	n D	54.0828	5554.91	+25	5555.16	1	n D	36.4658	55.79	+19	55.98							56.09	+19	5556.28
2	n D	54.2013	5561.50	+24	5561.74	1	n D	36.3487	62.19	+19	62.38		nn D	56.5818	61.51	+ 2	61.53	61.96	+18	5562.15
2	n B	54.2402	5563.38	+24	5563.62	2	n B	36.3119	64.21	+19	64.40							64.51	+19	5564.70
2	n D	54.2845	5566.15	+24	5566.39	1	n D	36.2720	66.40	+18	66.58							66.69	+19	5566.88
1	n D	54.3385	5569.18	+23	5569.41	1	n D	36.2124	69.68	+18	69.86							69.97	+19	5570.16
2	n B	54.3637	5570.60	+23	5570.83															
1	n D	54.3895	5572.05	+23	5572.28															
						1	D?	36.1460	73.40	+18	73.58							73.69	+19	5573.9
2	wn D	54.4591	5575.98	+23	5576.21															
10	wn D	54.5790	5582.76	+22	5582.98	9	D	35.9638	83.47	+17	83.64	9	n D	56.9691	83.37	+ 2	83.39	83.52	+19	5583.71
	Head	54.6151	5584.81	+22	5585.03															
5	B	54.6373	5586.08	+22	5586.30	5	B	35.9097	86.49	+17	86.66							86.77	+19	5586.96
1	n D	54.6735	5588.14	+21	5588.35	1	D	35.8810	88.09	+17	88.26		nn D	57.0788	89.63	+ 2	89.65	88.95	+19	5589.14
7	n B	54.7220	5590.91	+21	5591.12													91.1±		5591.3±
						1	n B	35.8063	92.28	+17	92.45		nn B	57.1241	92.23	+ 2	92.25	92.35	+19	5592.54
	nn D	54.7591	5593.03	+21	5593.24															
						1	n D	35.7768	93.94	+16	94.10							94.21	+19	5594.40
9	n B	54.8125	5596.09	+21	5596.30	4	n B	35.7230	96.96	+16	97.12	3	n B	57.2174	97.59	+ 2	97.61	97.37	+19	5597.56
						1	n D	35.6807	99.35	+16	99.51							99.62	+19	5599.81
	wn D	55.0273	5608.48	+20	5608.68		wn D	35.5058	09.27	+15	09.42		wn D	57.4265	09.68	+ 2	09.70	09.56	+19	5609.75
						B	from	35.4810	10.60	+15	10.75							10.86	+19	5611.1
2	n B	55.1672	5616.61	+18	5616.79	B		35.3707	16.98	+14	17.12							17.23	+19	5617.42
						B	to	35.3520	18.00	+14	18.14							18.25	+19	5618.4
	nn D	55.2195	5619.66	+18	5619.84		nn D	35.3203	19.87	+14	20.01							20.12	+19	5620 31
5	n D?	55.2917	5623.89	+18	5624.07		nn D	35.2440	24.25	+13	24.38							24.49	+19	5624.68
B	from	55.3220	5625.66	+18	5625.84															
B						1	n B	35.1907	27.33	+13	27.46							27.57	+19	5627.76
B	Max	55.3865	5629.47	+17	5629.64	1	n B	35.1425	30.11	+13	30.24							30.35	+19	5630.54
B	to	55.4080	5630.70	+17	5630.87															
10	w D	55.4513	5633.29	+17	5633.46	10	w D	35.0832	33.55	+12	33.67	10	n D	57.8438	34.17	0	34.17	33.92	+19	5634.11
	Head	55.4925	5635.73	+17	5635.90		Head	35.0335	36.44	+12	36.56		Head	57.8971	37.32	0	37.32	36.94	+19	5637.13
							B to	34.9390	41.90	+11	42.01							42.12	+19	5642.3
						1	n D	34.9152	43.33	+11	43.44							43.55	+19	5643.74
						B	from	34.8910	44.70	+11	44.81							44.92	+19	5645.1
						B	Max	34.7160	55.03	+ 9	55.12							55.23	+19	5655.42
						B	to	34.7010	56.01	+ 9	56.10							56.21	+19	5656.4
	nn D	56.0603	5669.80	+14	5669.94															
						1	n D	34.4457	71.07	+ 7	71.14							71.25	+19	5671.44
	nn B	56.1088	5672.75	+14	5672.89	4	n B	34.4115	73.12	+ 7	73.19							73.40	+19	5673.59
	nn D	56.1550	5675.57	+13	5675.70	1	n D	34.3632	76.01	+ 6	76.07							76.57	+19	5676.76
	nn D	56.3095	5685.04	+13	5685.17															
						1	D	34.1700	87.60	+ 5	87.65							87.76	+19	5688.0
	nn B	56.4272	5692.30	+12	5692.42		wn B	34.0728	93.55	+ 4	93.59							93.70	+19	5693.89
						1	n D	34.0185	96.85	+ 3	96.88		nn D	58.8840	97.30	− 8	97.22	97.05	+19	5697.24
	nn B	56.6180	5704.17	+11	5704.28															
						5	n B	33.8839	05.08	+ 2	05.10		nn B	59.0153	05.44	− 8	05.36	05.23	+19	5705.42
	nn D	56.6618	5706.90	+11	5707.01	4	n D	33.8359	08.03	+ 1	08.04		nn D	59.0651	08.56	− 8	08.48	08.26	+19	5708.45
						2	n B	33.7957	10.50	+ 1	10.51							10.62	+19	5710.81
	nn D	56.7415	5711.90	+11	5712.01	2	n D	33.7610	12.64	0	12.64							12.75	+19	5712.94
						B	from	33.7360	14.20	0	14.20							14.31	+19	5714.5
						B	to	33.6430	19.90	− 1	19.89							20.00	+19	5720.2
	nn D	56.8735	5720.22	+10	5720.32	1	n D	33.6153	21.66	− 1	21.65							21.76	+19	5721.95
	nn B	56.9211	5723.23	+10	5723.33	4	n B	33.5777	23.99	− 2	23.97							24.08	+19	5724.27
3	n D	57.0325	5730.31	+10	5730.41		wn D	33.4608	31.29	− 3	31.26	3-4	nn D	59.4391	31.61	−10	31.51	31.32	+19	5731.51
							from	33.4250	33.51	− 3	33.48							33.59	+19	5733.8
						Em.	to	33.2990	41.44	− 5	41.39							41.50	+19	5741.7
						Spec.	nn D	33.2642	43.64	− 5	43.59							43.70	+19	5743.89
	wn D	57.2991	5747.40	+ 8	5747.48															
							nn D	33.1718	49.49	− 6	49.43							49.54	+19	5749.73
						Max	B	33.0560	56.86	− 8	56.78							56.89	+19	5757.08
	nn D	57.5171	5761.54	+ 8	5761.62		nn D	32.9707	62.31	− 8	62.23							62.34	+19	5762.53
							nn D	32.8330	71.15	−10	71.05							71.16	+19	5771.35
						1	n D	32.7225	78.29	−11	78.18							78.29	+19	5778.48

318 *BIRMINGHAM—Continued*

Plate G 253						Plate G 284						Plate G 379						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Form.	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Form.	Cor. from Curve	Wave-Length	Uncor. for Velocity	Cor. for V	Cor. for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
2	n D	57.8585	5783.37	+ 7	5783.44	....	wn D	32.6312	84.22	−11	84.11	....	......	......	.....	....	.....	84.22	+19	5784.41
....	nn D	58.0530	5796.96	+ 6	5797.02	....	......	....	.....	....	.....	....	......	......	.....	....	.....	.....	....	....
....	......	....	....	....	....	1	nn D	32.4060	98.90	−13	98.77	....	......	......	.....	....	.....	98.88	+19	5799.1
....	nn D	58.3350	5815.97	+ 5	5816.02	....	......	....	.....	....	.....	....	......	......	.....	....	.....	.....	....	....
....	......	....	....	....	....	1	nn D	32.1120	18.40	−14	18.26	....	......	......	.....	.	.....	18.37	+19	5818.5
....	nn D	58.4216	5821.87	+ 5	5821.92	....	......	....	.....	....	.....	....	......	......	.....	....	.....	.....	....	....
....	nn D	58.5381	5829.83	+ 5	5829.88	....	......	....	.....	....	.....	....	......	......	.....	....	.....	.....	....	....
....	nn D	58.5988	5834.07	+ 4	5834.11	....	......	....	.....	....	.....	....	......	......	.....	....	.....	.....	....	....
....	nn D	58.6518	5837.66	+ 4	5837.70	....	......	....	.....	....	.....	....	......	......	.....	.	.....	.....	....	....
....	......	....	....	....	....	1	n D	31.6693	48.31	−15	48.16	....	......	......	.....	....	.....	48.27	+19	5848.46
	End	59.0350	5864.30	+ 4	5864.34	....	......	....	.....	....	.....	....	......	......	.....	....	.....	.....	....	5864.

74 *SCHJELLERUP*

Plate G 383 1900, February 1, G.M.T. 17h3. Hour angle, W 1h8 Star fair; comparison fair						Plate G 391 1900, March 7, G.M.T. 15h5. Hour angle, W 2h3 Star fair; comparison fair						Wave-Length from G 391 only		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
...	wn D	58.2020	4395.10	−21	4394.89	...	wn D	60.4865	4395.64	−51	4395.13	95.13	− 7	4395.06
...	....	....	....	....	....	...	wn D	60.1810	4401.30	−51	4400.79	00.79	− 7	4400.72
2–3	n B	57.7867	4402.86	−22	4402.64	...	B	60.0825	4403.19	−51	4402.68	02.68	− 7	4402.61
...	....	....	....	....	....	Limits		60.1200	4402.40	−51	4401.89	01.89	− 7	4401.8
...	....	....	....	....	....	Limits		60.0290	4404.20	−51	4403.69	03.69	− 7	4403.6
...	....	....	....	....	....	...	nn D	59.9480	4405.70	−51	4405.19	05.19	− 7	4405.12
...	nn D	57.4610	4409.00	−24	4408.76	...	wn D	59.7610	4409.20	−52	4408.68	08.68	− 7	4408.61
...	nn D	57.1240	4415.40	−25	4415.15	...	nn D	59.4130	4415.90	−52	4415.38	15.38	− 7	4415.31
...	nn D	56.4610	4428.10	−28	4427.82	3	nn D	58.7620	4428.40	−52	4427.88	27.88	− 7	4427.81
...	....	....	....	....	....	...	nn D	58.6370	4431.01	−52	4430.49	30.49	− 7	4430.42
...	wn D	56.0640	4435.90	−28	4435.62	...	wn D	58.3620	4436.31	−52	4435.79	35.79	− 7	4435.72
...	....	....	....	....	....	5	n B	57.7010	4449.46	−51	4448.95	48.95	− 7	4448.88
...	nn D	55.3284	4450.50	−30	4450.20	...	wn D	57.6272	4450.94	−51	4450.43	50.43	− 8	4450.35
...	....	....	....	....	....	...	nn D	57.3560	4456.40	−51	4455.89	55.89	− 8	4455.81
...	....	....	....	....	....	...	nn D	57.1490	4460.60	−51	4460.09	60.09	− 8	4460.01
...	....	....	....	....	....	...	nn D	57.0296	4463.07	−51	4462.56	62.56	− 8	4462.48
...	....	....	....	....	....	B	from	56.9990	4463.70	−51	4463.19	63.19	− 8	4463.1
...	wn B	54.6426	4464.39	−31	4464.08	B	....	....	....	....	....	.....	....	....
...	....	....	....	....	....	B	to	56.9140	4465.40	−51	4464.89	64.89	− 8	4464.8
...	nn D	54.2796	4471.86	−32	4471.54	...	....	....	....	....	....	.....	....	....
...	....	....	....	....	....	Max	B	56.4620	4474.80	−50	4474.30	74.30	− 8	4474.2
...	....	....	....	....	....	1	nn D	56.4000	4476.00	−50	4475.50	75.50	− 8	4475.42
Max	B	53.9170	4479.40	−32	4479.08	...	....	....	....	....	....	.....	....	....
...	....	....	....	....	....	1	nn D	56.1746	4480.80	−50	4480.30	80.30	− 8	4480.22
...	....	....	....	....	....	1	nn D	56.0743	4482.91	−49	4482.42	82.42	− 8	4482.34
Max	B	53.6900	4484.20	−33	4483.87	...	....	....	....	....	....	.....	....	....
...	....	....	....	....	....	1–2	nn D	55.8246	4488.18	−49	4487.69	87.69	− 8	4487.61
...	....	....	....	....	....	1	n D	55.7099	4490.62	−49	4490.13	90.13	− 8	4490.05
...	wn D	53.0780	4497.20	−33	4496.87	2	n D	55.3752	4497.77	−48	4497.29	97.29	− 8	4497.21
...	....	....	....	....	....	1–2	nn D	55.1543	4502.53	−48	4502.05	02.05	− 8	4501.97
B	from	52.8140	4502.80	−33	4502.47	B	from	55.1250	4503.10	−47	4502.63	02.63	− 8	4502.5
B	to	52.6540	4506.30	−33	4505.97	B	to	54.9540	4506.80	−47	4506.33	06.33	− 8	4506.3
...	....	....	....	....	....	2–3	nn D	54.9215	4507.59	−47	4507.12	07.12	− 8	4507.04
...	....	....	....	....	....	1	nn D	54.7896	4510.46	−47	4509.99	09.99	− 8	4509.91
...	....	....	....	....	....	...	nn D	54.6760	4512.90	−47	4512.43	12.43	− 8	4512.4
...	....	....	....	....	....	1	nn B	54.4351	4518.25	−46	4517.79	17.79	− 8	4517.71
...	....	....	....	....	....	1–2	n D	54.4082	4518.92	−46	4518.46	18.46	− 8	4518.38
...	....	....	....	....	....	8	n B	54.2459	4522.45	−46	4521.99	21.99	− 8	4521.91

74 *SCHJELLERUP—Continued*

Plate G 383						Plate G 391						Wave-Length from G 391 only		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
1	nn D	51.8680	4523.57	−32	4523.25	2	nn D	54.1879	4523.73	−45	4523.28	23.28	− 8	4523.20
...	....	....	....	....	....	0	nn D	54.0010	4527.90	−45	4527.45	27.45	− 8	4527.4
1	D	51.6014	4529.52	−32	4529.20	...	....	....	....	....	....	.....	....	....
...	....	....	....	....	....	1	nn D	53.8414	4531.48	−44	4531.04	31.04	− 8	4530.96
...	....	....	....	....	....	...	nn D	53.6220	4536.40	−44	4535.96	35.96	− 8	4535.9
B	from	51.2760	4536.90	−31	4536.59	B	from	53.5910	4537.10	−44	4536.66	36.66	− 8	4536.6
	to	51.1430	4539.90	−31	4539.59		to	53.4450	4540.40	−44	4539.96	39.96	− 8	4539.9
...	....	....	....	....	....	1-2	nn D	53.4177	4541.08	−43	4540.65	40.65	− 8	4540.57
...	....	....	....	....	....	B	from	53.1430	4547.30	−43	4546.87	46.87	− 8	4546.8
Max	B	50.7896	4547.94	−30	4547.64		....	....	....	....	....	.....	....	....
...	....	....	....	....	....		to	53.0720	4549.00	−42	4548.58	48.58	− 8	4548.5
...	nn D	50.5253	4554.04	−29	4553.75	...	w D	52.8309	4554.56	−41	4554.15	54.15	− 8	4554.07
...	....	....	....	....	....	B	from	52.7730	4555.90	−41	4555.49	55.49	− 8	4555.4
Max	B	50.3232	4558.74	−29	4558.45		....	....	....	....	....	.....	....	....
...	....	....	....	....	....		to	52.5770	4560.40	−41	4559.99	59.99	− 8	4559.9
...	....	....	....	....	....	...	nn D	52.5555	4560.97	−41	4560.56	60.56	− 8	4560.48
...	....	....	....	....	....	...	nn D	52.4284	4563.95	−40	4563.55	63.55	− 8	4563.47
...	....	....	....	....	....	1	n D	52.3319	4566.22	−40	4565.82	65.82	− 8	4565.74
...	wn D	49.7528	4572.14	−27	4571.87	...	nn D	52.0960	4571.80	−39	4571.41	71.41	− 8	4571.3
2	n D	49.5500	4576.97	−26	4576.71	...	nn D	51.8300	4578.10	−37	4577.73	77.73	− 8	4577.7
...	....	....	....	....	....	...	nn D	51.2670	4591.70	−35	4591.35	91.35	− 8	4591.3
...	....	....	....	....	....	...	nn D	51.1280	4595.12	−35	4594.77	94.77	− 8	4594.69
...	....	....	....	....	....	4	n B	51.0594	4596.78	−35	4596.43	96.23	− 8	4596.15
...	....	....	....	....	....	2	n B	50.9218	4600.17	−34	4599.83	99.83	− 8	4599.75
...	....	....	....	....	....	1	n D	50.8759	4601.29	−34	4600.95	00.95	− 8	4600.86
...	....	....	....	....	....	1	n B	50.8237	4602.58	−34	4602.24	02.24	− 8	4602.16
...	wn D	48.3246	4606.81	−21	4606.60	8	wn D	50.6337	4607.29	−33	4606.96	06.96	− 8	4606.88
...	....	....	....	....	....	5	wn B	50.5428	4609.30	−32	4608.98	08.98	− 8	4608.90
...	....	....	....	....	....	1	n D	50.4861	4610.96	−32	4610.64	10.64	− 8	4610.56
2	nn B	48.1030	4612.30	−20	4612.10	...	....	....	....	....	....	.....	....	....
...	....	....	....	....	....	2	n D	50.3577	4614.17	−32	4613.85	13.85	− 8	4613.77
2	nn B	47.9930	4615.10	−20	4614.90	...	....	....	....	....	....	.....	....	....
...	....	....	....	....	....	6	n B	50.3072	4615.43	−32	4615.11	15.11	− 8	4615.03
...	....	....	....	....	....	3	n D	50.2564	4616.71	−32	4616.39	16.39	− 8	4616.31
8	B	47.8800	4617.92	−20	4617.72	10	w B	50.1900	4618.38	−31	4618.07	18.07	− 8	4617.99
...	wn D	47.8031	4619.86	−19	4619.67	3	n D	50.1222	4620.09	−31	4619.78	19.78	− 8	4619.70
Max	B	47.7306	4621.70	−19	4621.51	5	n B	50.0477	4621.97	−31	4621.66	21.66	− 8	4621.58
...	n D	47.6758	4622.08	−19	4621.89	...	....	....	....	....	....	.....	....	....
...	....	....	....	....	....	1-2	nn D	49.9884	4623.47	−30	4623.17	23.17	− 8	4623.09
...	....	....	....	....	....	B	from	49.9680	4624.00	−30	4623.70	23.70	− 8	4623.6
Max	B	47.6200	4624.50	−18	4624.32		....	....	....	....	....	.....	....	....
Max	B	47.5120	4627.30	−18	4627.12		....	....	....	....	....	.....	....	....
...	....	....	....	....	....		to	49.7970	4628.30	−30	4628.00	28.00	− 8	4627.9
...	....	....	....	....	....	6-8	nn D	49.7519	4629.49	−29	4629.20	29.20	− 8	4629.12
Max	B	47.3525	4631.32	−18	4631.14	9	n B	49.6712	4631.55	−29	4631.26	31.26	− 8	4631.18
...	....	....	....	....	....	1	nn D	49.5357	4635.00	−29	4634.71	34.71	− 8	4634.63
...	....	....	....	....	....	1	nn D	49.4289	4637.78	−29	4637.49	37.49	− 8	4637.41
5	nn B	47.0662	4638.69	−17	4638.52	7	B	49.3664	4639.39	−28	4639.11	39.11	− 8	4639.03
...	nn D	47.0072	4640.22	−17	4640.05	5	D	49.3100	4641.12	−28	4640.84	40.84	− 8	4640.76
7	wn B	46.9237	4642.38	−17	4642.21	10	B	49.2399	4642.67	−28	4642.39	42.39	− 8	4642.31
...	....	....	....	....	....	Limits		49.2850	4641.50	−28	4641.22	41.22	− 8	4641.1
...	....	....	....	....	....	Limits		49.2030	4643.60	−28	4643.32	43.32	− 8	4643.2
...	wn D	46.7670	4646.50	−16	4646.34	...	....	....	....	....	....	.....	....	....
...	....	....	....	....	....	1	nn B	48.8300	4653.40	−27	4653.13	53.13	− 8	4653.05
...	wn B	46.3860	4656.50	−16	4656.34	...	....	....	....	....	....	.....	....	....
...	wn B	46.0320	4665.90	−15	4665.75	1-2	n B	48.3704	4665.57	−25	4665.32	65.32	− 8	4665.24
D	from	44.3100	4713.30	−20	4713.10	...	....	....	....	....	....	.....	....	....
	....	....	....	....	....	...	wn D	46.5664	4715.22	−21	4715.01	15.01	− 8	4714.93
	to	44.1910	4716.70	−20	4716.50	...	....	....	....	....	....	.....	....	....
B	from	44.1910	4716.70	−20	4716.50	...	....	....	....	....	....	.....	....	....
	....	....	....	....	....	1-2	n B	46.3751	4720.67	−21	4720.46	20.46	− 8	4720.38
	to	44.0200	4721.60	−21	4721.39	...	....	....	....	....	....	.....	....	....
...	nn D	43.9790	4722.80	−21	4722.59	1	n D	46.2887	4723.14	−21	4722.93	22.93	− 8	4722.85
...	....	....	....	....	....	1	nn D	46.0890	4728.80	−20	4728.60	28.60	− 8	4728.52
...	nn D	43.7280	4730.00	−23	4729.77	...	....	....	....	....	....	.....	....	....

74 *SCHJELLERUP—Continued*

Plate G 383						Plate G 391						Wave-Length from G 391 only		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
D	from	43.5460	4735.30	−24	4735.06	D	from	45.8880	4734.60	−20	4734.40	34.39	− 8	4734.3
	to	43.4640	4737.70	−24	4737.46		to	45.7790	4737.87	−20	4737.67	37.67	− 8	4737.6
10	wn D	43.5025	4736.56	−24	4736.32	...	....	....	....	....	....	.....	....	....
10	nn B	43.4117	4739.21	−25	4738.96	10	B	45.7409	4738.97	−20	4738.77	38.77	− 8	4738.69
...	....	....	....	....	....	Con. Spec.	from	45.7070	4739.90	−20	4739.70	39.70	− 8	4739.6
...	....	....	....	....	....		to	45.6230	4742.40	−20	4742.20	42.20	− 8	4742.1
...	nn D	43.2249	4744.69	−26	4744.43	...	D	45.5649	4744.12	−20	4743.92	43.92	− 8	4743.84
...	....	....	....	....	....	Lts.	from	45.6178	4742.56	−20	4742.36	42.36	− 8	4742.3
...	....	....	....	....	....		to	45.5043	4745.90	−19	4745.71	45.71	− 8	4745.6
...	....	....	....	....	....	B	from	45.5043	4745.90	−19	4745.71	45.71	− 8	4745.6
...	....	....	....	....	....		to	45.4030	4748.90	−19	4748.71	48.71	− 8	4748.6
...	....	....	....	....	....	...	nn D	45.3820	4749.50	−19	4749.31	49.31	− 8	4749.23
...	....	....	....	....	....	B	from	45.2410	4753.60	−19	4753.41	53.41	− 8	4753.3
...	....	....	....	....	....		to	45.0980	4757.90	−19	4757.71	57.71	− 8	4757.6
...	nn D	42.7371	4759.18	−29	4758.89	3-4	nn D	45.0587	4759.10	−19	4758.91	58.91	− 8	4758.83
...	....	....	....	....	....	B	from	45.0150	4760.40	−19	4760.21	60.21	− 8	4760.1
...	....	....	....	....	....		to	44.8240	4766.10	−19	4765.91	65.91	− 8	4765.8
...	....	....	....	....	....	...	nn D	44.8089	4766.60	−19	4766.41	66.41	− 8	4766.33
...	....	....	....	....	....	B	from	44.7800	4767.40	−19	4767.21	67.21	− 8	4767.1
...	....	....	....	....	....		to	44.6150	4772.40	−19	4772.21	72.21	− 8	4772.1
...	nn D	42.2610	4773.60	−32	4773.28	...	nn D	44.5834	4773.42	−19	4773.23	73.23	− 8	4773.15
...	....	....	....	....	....	B	from	44.5570	4774.20	−19	4774.01	74.01	− 8	4773.9
...	....	....	....	....	....		to	44.4160	4778.50	−19	4778.31	78.31	− 8	4778.2
1	nn D	41.8912	4784.90	−34	4784.56	1-2	nn D	44.2150	4784.70	−19	4784.51	84.51	− 8	4784.43
2	nn D	41.7176	4790.28	−36	4789.92	2	n D	44.0579	4789.53	−19	4789.34	89.34	− 8	4789.26
B	from	41.6890	4791.20	−36	4790.84	B	from	44.0290	4790.40	−19	4790.21	90.21	− 8	4790.1
	to	....	....	....	....		to	43.8300	4796.61	−19	4796.42	96.42	− 8	4796.3
...	....	....	....	....	....	8	n B	43.6348	4802.71	−19	4802.52	02.52	− 8	4802.44
...	....	....	....	....	....	...	n D	43.4940	4807.10	−20	4806.90	06.90	− 8	4806.82
...	....	....	....	....	....	...	n D	43.3270	4812.40	−20	4812.20	12.20	− 8	4812.12

74 *SCHJELLERUP*

Plate G 373 1900, January 7, G.M.T. 15h0. Hour angle, E 2h1 Star good; comparison good						Plate G 386 1900, February 16, G.M.T. 14h8. Hour angle, W 0h3 Star poor; comparison fair						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
3	n D	49.4320	5173.44	−16	5173.28	3-4	D	45.1046	5173.79	−48	5173.31	73.30	− 9	5173.21
	from	49.2160	5182.20	−17	5182.03	...	....	....	....	....	....	81.83	− 9	5181.7
D	.....	....	....	....	....	...	D?	44.8410	5184.50	−50	5184.00	84.20	− 9	5184.11
	to	49.1240	5186.00	−17	5185.83	...	....	....	....	....	....	85.63	− 9	5185.5
Con.	from	49.1240	5186.00	−17	5185.83	...	....	....	....	....	....	85.63	− 9	5185.5
	.....	....	....	....	....	...	D?	44.7210	5189.50	−50	5189.00	89.20	− 9	5189.11
Spec.	to	48.9780	5191.90	−17	5191.73	...	....	....	....	....	....	91.53	− 9	5191.4
4	D	48.9444	5193.32	−18	5193.14	...	D??	44.6200	5193.60	−51	5193.09	93.12	− 9	5193.03
Max	B	48.8394	5197.65	−18	5197.47	...	....	....	....	....	....	97.27	− 9	5197.18
	from	48.6610	5205.10	−19	5204.91	...	....	....	....	....	....	04.71	− 9	5204.6
D	.....	....	....	....	....	...	D??	44.2120	5210.60	−52	5210.08	10.28	− 9	5210.19
	to	48.5040	5211.60	−19	5211.41	...	....	....	....	....	....	11.21	− 9	5211.1
	from	48.4780	5212.70	−19	5212.51	...	....	....	....	....	....	12.31	− 9	5212.2
B	.....	....	....	....	....	...	D??	44.0580	52.1700	−53	5216.47	16.67	− 9	5216.58
	to	48.1930	5224.70	−20	5224.50	...	....	....	....	....	....	24.30	− 9	5224.2
6-8	w D	48.1469	5226.66	−20	5226.46	...	wn D	43.8320	5226.60	−54	5226.06	26.26	− 9	5226.17
B	from	48.0860	5229.30	−20	5229.10	...	....	....	....	....	....	28.90	− 9	5228.8
	to	47.9820	5233.78	−20	5233.58	...	....	....	....	....	....	33.38	− 9	5233.3

74 *SCHJELLERUP—Continued*

Plate G 373						Plate G 386						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
2	n D	47.9641	5234.44	−20	5234.24	...	D?	43.6420	5234.70	−55	5234.15	34.04	− 9	5233.95
2	n B	47.8913	5237.56	−21	5237.35	...	....	....	....	....	....	37.15	− 9	5237.06
...	nn D	47.8283	5240.27	−21	5240.06	...	D?	43.4970	5240.90	−55	5240.35	40.21	− 9	5240.12
2-3	nn B	47.7130	5245.30	−21	5245.09	...	....	....	....	....	....	44.89	− 9	5244.80
3	n D	47.6561	5247.69	−21	5247.48	...	D?	43.3360	5247.90	−56	5247.34	47.41	− 9	5247.32
2	n D	47.5628	5252.17	−21	5251.96	...	D?	43.2400	5252.10	−56	5251.54	51.75	− 9	5251.66
3	wn D	47.1322	5270.59	−22	5270.37	...	wn D	42.8150	5270.70	−56	5270.14	70.26	− 9	5270.17
1	n D	46.8311	5284.42	−22	5284.20	...	....	....	....	....	....	84.00	− 9	5283.91
3	nn D	46.5147	5298.21	−22	5297.99	...	....	....	....	....	....	97.79	− 9	5297.70
1–2	n D	46.4096	5302.98	−22	5302.76	...	....	....	....	....	....	02.56	− 9	5302.47
1	nn D	46.3064	5307.68	−22	5307.46	...	....	....	....	....	....	07.26	− 9	5307.17
1	n D	46.1307	5315.73	−22	5315.51	1-2	n D	41.8151	5315.81	−55	5315.26	15.39	− 9	5315.30
8	n B	46.0765	5318.22	−22	5318.00	1	B	41.7738	5317.72	−54	5317.18	17.59	− 9	5317.50
...	....	....	....	....	....	1-2	n D	41.7014	5321.06	−54	5320.52	20.72	− 9	5320.63
2–3	n D	45.8363	5329.34	−21	5329.13	2	n D	41.5178	5329.59	−54	5329.05	29.09	− 9	5329.00
2	nn D	45.6677	5337.22	−21	5337.01	...	nn D	41.3590	5337.00	−53	5336.47	36.74	− 9	5336.65
4	n B	45.6254	5339.20	−21	5338.99	...	....	....	....	....	....	38.79	− 9	5338.70
2	n D	45.5680	5341.90	−21	5341.69	1–2	n D	41.2588	5341.72	−53	5341.19	41.44	− 9	5341.35
2	n D	45.3895	5350.32	−20	5350.12	...	....	....	....	....	....	49.92	− 9	5349.83
...	....	....	....	....	....	...	nn D	40.8260	5362.30	−52	5361.78	61.98	− 9	5361.89
1	n D	45.0436	5366.84	−19	5366.65	...	....	....	....	....	....	66.45	−10	5366.35
5	D	44 9377	5371.94	−19	5371.75	6	wn D	40.6243	5372.00	−51	5371.49	71.62	−10	5371.52
8	n B	44.8721	5375.11	−19	5374.92	2	nn B	40.5560	5375.30	−51	5374.79	74.86	−10	5374.76
2	n D	44.8173	5377.77	−19	5377.58	2	nn D	40.5028	5377.89	−51	5377.38	77.48	−10	5377.38
6	n B	44.7632	5380.39	−18	5380.21	...	....	....	....	....	....	80.01	−10	5379.91
...	....	....	....	....	....	...	nn D	40.3560	5385.10	−51	5384.59	84.79	−10	5384.69
3	n B	44.4953	5393.49	−18	5393.31	...	....	....	....	....	....	93.11	−10	5393.01
3	D	44.4056	5397.92	−17	5397.75	2	n D	40.1023	5397.51	−50	5397.01	97.38	−10	5397.28
B	from	44.3790	5399.30	−17	5599.13	...	....	....	....	....	....	98.93	−10	5398.8
	to	44.2480	5405.80	−17	5405.63	...	....	....	....	....	....	05.43	−10	5405.3
1	n D	44.2273	5406.75	−17	5406.58	...	....	....	....	....	....	06.38	−10	5406.28
3–4	n D	44.1450	5410.85	−16	5410.69	1-2	n D	39.8383	5410.62	−49	5410.13	10.41	−10	5410.31
1	n B	44.1064	5412.78	−16	5412.62	...	....	....	....	....	....	12.42	−10	5412.32
6	B	44.0135	5417.43	−16	5417.27	2-3	n B	39.7022	5417.44	−49	5416.95	17.11	−10	5417.01
3	n D	43.9562	5420.31	−16	5420.15	3 4	n D	39.6523	5419.95	−49	5419.36	19.76	−10	5419.66
2–3	n B	43.8945	5423.42	−15	5423.27	...	....	....	....	....	....	23.07	−10	5422.97
2	n B	43.8128	5427.54	−15	5427.39	...	....	....	....	....	....	27.19	−10	5427.09
3-4	n D	43.7561	5430.42	−15	5430.27	3	n D	39.4508	5430.14	−48	5429.66	29.97	−10	5429.87
1	n B	43.7176	5432.59	−15	5432.44	...	....	....	....	....	....	32.24	−10	5432.14
2	nn D	43.6727	5434.66	−15	5434.51	1-2	n D	39.3618	5434.67	−48	5434.19	34.35	−10	5434.25
...	....	....	....	....	....	1	n D	39.2880	5438.44	−48	5437.96	38.16	−10	5438.06
B	from	43.5690	5439.00	−15	5438.85	...	....	....	....	....	....	38.65	−10	5438.55
	to	43.4420	5446.50	−14	5446.36	...	....	....	....	....	....	46.16	−10	5446.06
6	n D	43.4057	5448.34	−14	5448.20	5	n D	39.0952	5448.34	−47	5447.87	48.04	−10	5447.94
2	n D	43.2348	5457.16	−14	5457.02	2–3	n D	38.9332	5456.73	−47	5456.26	56.64	−10	5456.54
1–2	B	43.1981	5459.07	−14	5458.93	...	....	....	....	....	....	58.73	−10	5458.63
1	n D	43.1647	5460.81	−14	5460.67	2	D	38.8511	5460.98	−47	5460.51	60.59	−10	5460.49
B	from	43.1480	5461.80	−14	5461.66	...	....	....	....	....	....	61.46	−10	5461.4
	to	43.0650	5466.60	−14	5466.46	...	....	....	....	....	....	66.26	−10	5466.2
1	n D	43.0384	5467.40	−14	5467.26	...	wn D	38.7040	5468.70	−47	5468.23	67.75	−10	5467.6
3	n B	42.9469	5472.20	−13	5472.07	1	n B	38.6393	5472.08	−47	5471.61	71.87	−10	5471.77
2	nn D	42.8981	5474.76	−13	5474.63	...	....	....	....	....	....	74.43	−10	5474.33
1	n D	42.8307	5478.32	−13	5478.19	...	....	....	....	....	....	77.99	−10	5477.89
4	n B	42.7858	5480.68	−13	5480.55	...	....	....	....	....	....	80.35	−10	5480.25
1	nn D	42.7422	5483.00	−13	5482.87	1–2	nn D	38.4319	5483.03	−46	5482.57	82.74	−10	5482.64
...	....	....	....	....	....	1	n D	38.2764	5491.31	−46	5490.85	91.05	−10	5490.95
3	n D	42.4573	5498.19	−13	5498.06	2	n D	38.1497	5498.10	−46	5497.64	97.85	−10	5497.75
2	n D	42.3813	5502.28	−13	5502.15	2	n D	38.0748	5502.13	−46	5501.67	01.91	−10	5501.81
1	n D	42.2922	5507.08	−12	5506.96	...	....	....	....	....	....	06.76	−10	5506.66
2	n B	42.2556	5509.06	−12	5508.94	...	....	....	....	....	....	08.74	−10	5508.64
1	nn D	42.1895	5512.64	−12	5512.52	2	nn D	37.8800	5512.70	−46	5512.24	12.38	−10	5512.28
...	wn D	41.9690	5524.68	−12	5524.56	1	n D	37.6637	5524.48	−46	5524.02	24.29	−10	5524.19
2	n B	41.8372	5531.92	−12	5531.80	...	....	....	....	....	....	31.60	−10	5531.50
1	n D	41.8017	5533.88	−12	5533.76	...	....	....	....	....	....	33.76	−10	5533.66
8	wn D	41.6950	5539.79	−12	5539.67	8	wn D	37.3918	5539.49	−46	5539.03	39.35	−10	5539.25

74 *SCHJELLERUP—Continued*

Plate G 373						Plate G 386						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		mm.			mm.	t.m.		t.m.	t.m.		t.m.
Max	B	41.6172	5544.11	−12	5543.99	1-2	nn B	37.3140	5543.80	−46	5543.34	43.67	−10	5543.57
1	nn D	41.4658	5552.62	−12	5552.50	...	....	....	....	....	....	52.30	−10	5552.20
1	n B	41.4334	5554.39	−12	5554.27	1	B	37.1284	5554.21	−46	5553.75	54.01	−10	5553.91
1	n D	41.4009	5556.22	−12	5556.10	...	....	....	....	....	....	55.90	−10	5555.80
1-2	B	41.2419	5565.19	−13	5565.06	1	B	36.9359	5565.07	−46	5564.61	64.83	−10	5564.73
1	wn D	41.2081	5567.10	−13	5566.97	2	n D	36.9050	5566.82	−46	5566.36	66.67	−10	5566.57
0-1	nn D	41.1502	5570.39	−13	5570.26	...	....	....	....	....	....	70.06	−10	5569.96
...	....	....	....	....	....	1	D	36.7830	5573.77	−46	5573.31	73.51	−10	5573.41
9	D	40.9025	5584.55	−13	5584.42	9	w D	36.6009	5584.20	−46	5583.74	84.08	−10	5583.98
4	B	40.8559	5587.24	−13	5587.11	3	n B	36.5467	5587.32	−46	5586.86	86.99	−10	5586.89
1	n D	40.8231	5589.13	−13	5589.00	1	n D	36.5076	5589.58	−46	5589.14	89.07	−10	5588.97
1	n D	40.7252	5594.79	−13	5594.66	1	nn D	36.4099	5595.24	−46	5594.78	94.72	−10	5594.62
3	n B	40.6685	5598.08	−14	5597.94	4	wn B	36.3717	5597.45	−46	5596.99	97.47	−10	5597.37
1	nn D	40.6351	5600.02	−14	5599.88	...	....	....	....	....	....	99.68	−10	5599.58
2	nn D	40.4658	5609.91	−14	5609.77	1	n D	36.1591	5609.88	−47	5609.41	09.59	−10	5609.49
...	....	....	....	....	....	D	from	36.0070	5618.90	−47	5618.43	18.63	−10	5618.5
...	....	....	....	....	....		to	35.8770	5626.50	−48	5626.02	26.22	−10	5626.1
3	n D	40.2844	5620.60	−15	5620.45	3-4	nn D	35.9767	5620.63	−48	5620.15	20.30	−10	5620.20
4	wn D	40.2078	5625.13	−15	5624.98	5	nn D	35.8986	5625.26	−48	5624.78	24.88	−10	5624.78
B	from	40.1750	5627.09	−15	5626.94	Con.	from	35.8710	5626.90	−48	5626.42	26.68	−10	5626.6
	to	40.0810	5632.70	−15	5632.55	Spec.	to	35.7790	5632.40	−48	5631.92	32.24	−10	5632.1
10	w D	40.0467	5634.73	−15	5634.58	10	wn D	35.7436	5634.50	−48	5634.02	34.30	−10	5634.20
Head		40.0051	5637.22	−16	5637.06	Head		35.7024	5636.97	−48	5636.49	36.78	−10	5636.68
...	....	....	....	....	....	2	n B	35.6791	5638.37	−48	5637.89	38.09	−10	5637.99
...	....	....	....	....	....	1	n D	35.6555	5639.79	−48	5639.31	39.51	−10	5639.41
...	....	....	....	....	....	2	n B	35.6234	5641.71	−48	5641.23	41.43	−10	5641.33
2	n D	39.8922	5644.00	−16	5643.84	2	n D	35.5812	5644.25	−48	5643.77	43.81	−10	5643.71
	from	39.8720	5645.30	−16	5645.14	...	....	....	....	....	....	44.94	−10	5644.84
B	....	....	....	....	....	1	nn D	35.4822	5650.24	−49	5649.75	49.95	−10	5649.85
	to	39.6670	5657.64	−17	5657.47	...	....	....	....	....	....	57.27	−10	5657.2
1	n D	39.6549	5658.37	−17	5658.20	3	n D	35.3383	5658.98	−49	5658.49	58.35	−10	5658.25
...	....	....	....	....	....	4	wn D	35.1314	5671.66	−50	5671.16	71.36	−10	5671.26
2	B	39.3863	5674.83	−18	5674.65	...	....	....	....	....	....	74.45	−10	5674.35
2	wn D	39.3469	5677.29	−18	5677.11	2	n D	35.0436	5677.07	−50	5676.57	76.84	−10	5676.74
1	B	39.3071	5679.72	−18	5679.54	...	....	....	....	....	....	79.34	−10	5679.24
1	nn D	39.1803	5687.59	−19	5687.40	1	nn D	34.8822	5687.09	−51	5686.58	86.99	−10	5686.89
6	n B	39.0737	5694.25	−19	5694.06	5	n B	34.7734	5693.88	−51	5693.37	93.72	−10	5693.62
0-1	B	38.9700	5700.75	−19	5700.56	...	....	....	....	....	....	00.36	−10	5700.26
2	B	38.8886	5705.88	−20	5705.68	3	n B	34.5880	5705.54	−52	5705.02	05.35	−10	5705.25
2	wn D	38.8399	5708.96	−20	5708.76	2	n D	34.5358	5708.84	−52	5708.32	08.54	−10	5708.44
1	B	38.7990	5711.55	−20	5711.35	...	....	....	....	....	....	11.15	−10	5711.05
2	n D	38.7682	5713.50	−20	5713.30	1	n D	34.4673	5713.18	−52	5712.66	12.98	−10	5712.88
4	wn B	38.6995	5717.87	−20	5717.67	4	wn B	34.4006	5717.43	−53	5716.90	17.29	−10	5717.19
1	n D	38.6360	5721.92	−20	5721.72	2	n D	34.3372	5721.47	−53	5720.94	21.33	−10	5721.23
3	n B	38.5946	5724.57	−20	5724.37	...	....	....	....	....	....	24.17	−10	5724.07
...	....	....	....	....	....		from	34.2510	5727.00	−53	5726.47	26.67	−10	5726.6
2	n D	38.4744	5732.28	−22	5732.06	D	....	....	....	....	....	31.86	−10	5731.76
...	....	....	....	....	....		to	34.1450	5733.80	−54	5733.26	33.46	−10	5733.4
Max	B	38.3920	5737.61	−22	5737.39	...	....	....	....	....	....	37.19	−10	5737.09
1	nn D	38.2860	5744.48	−22	5744.26	...	....	....	....	....	....	44.06	−10	5743.96
1	n D	38.0039	5762.92	−24	5762.68	...	nn D	33.6910	5763.40	−56	5762.84	62.76	−10	5762.66
...	wn D	37.8645	5772.13	−24	5771.89	...	nn D	33.5719	5771.96	−56	5771.40	71.69	−10	5771.59
1	nn D	37.7701	5778.40	−24	5778.16	...	....	....	....	....	....	77.96	−10	5777.86
B	from	37.8770	5774.00	−24	5773.76	...	....	....	....	....	....	73.56	−10	5773.5
	to	37.7090	5782.50	−25	5782.25	...	....	....	....	....	....	82.05	−10	5782.0
D	from	37.7090	5782.50	−25	5782.25	...	....	....	....	....	....	82.05	−10	5782.0
	to	37.5710	5791.80	−25	5791.55	...	....	....	....	....	....	91.35	−10	5791.3
1	nn D	37.4625	5799.05	−25	5798.80	...	....	....	....	....	....	98.60	−10	5798.50
2	n D	37.1044	5823.47	−25	5823.22	...	....	....	....	....	....	23.02	−10	5822.92

78 *SCHJELLERUP*

Plate G 344 1899, October 4, G.M.T. 20h±. Hour angle, E 3h± Star good; comparison excellent						Plate G 392 1900, March 21, G.M.T. 18h±. Hour angle, E 3h± Star excellent; comparison good						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
...	....	....	....	....	....	1	nn D	53.6860	4388.20	−40	4387.80	87 60	+ 1	4387.6
...	....	....	....	....	....	2	D	53.5655	4390.41	−40	4390.01	89.81	+ 1	4389.82
...	wn D	61.6970	4395.00	+29	4395.29	8	w D	53.3033	4395.30	−42	4394.88	95.09	+ 1	4395.10
...	wn D	61.4100	4400.40	+28	4400.68	1	nn D	52.9584	4401.77	−44	4401.33	01.13	+ 1	4401.14
2	n B	61.3173	4402.19	+28	4402.47	...	....	....	....	....	....	02.67	+ 1	4402.68
...	nn D	61 1835	4404.75	+27	4405.02	...	nn D	52.7441	4405.82	−45	4405.37	05.20	+ 1	4405.21
...	....	....	....	....	....	3	nn D	52.5560	4409.40	−46	4408.94	08.74	+ 1	4408.75
...	wn D	60.6560	4414.90	+25	4415.15	3	wn D	52.2179	4415.87	−49	4415.38	15.17	+ 1	4415.18
...	nn D	60.3900	4420.10	+24	4420.34	...	....	....	....	....	....	20.54	+ 1	4420.55
...	wn D	60.2660	4422.50	+23	4422.73	...	....	....	....	....	....	22.93	+ 1	4422.94
...	nn D	60.0996	4425.81	+23	4426.04	...	....	....	....	....	....	26.24	+ 1	4426.25
...	nn D	60.0268	4427.25	+22	4427.47	1	nn D	51.5790	4428.28	−52	4427.76	27.62	+ 1	4427.63
...	nn D	59.8865	4430.03	+22	4430.25	1	nn D	51.4412	4430.98	−52	4430.46	30.36	+ 1	4430.37
6	wn D	59.6087	4435.56	+22	4435.78	7	wn D	51.1578	4436.58	−54	4436.04	35.91	+ 1	4435.92
1	nn D	59.4958	4437.82	+21	4438.03	...	....	....	....	....	....	38.13	+ 1	4438.14
2	n B	59.4438	4438.87	+21	4439.08	3	nn B	50.9694	4440.32	−55	4439.77	39.43	+ 1	4439.44
1	nn D	59.2985	4441.80	+21	4442.01	...	....	....	....	....	....	42.21	+ 1	4442.22
2	n D	59.1816	4444.16	+21	4444.37	...	....	....	....	....	....	44.57	+ 1	4444.58
1	nn D	59.0300	4447.24	+21	4447.45	...	....	....	....	....	....	47.65	+ 1	4447.66
2	n B	58.9710	4448.44	+21	4448.65	3	nn B	50.5042	4449.65	−57	4449.08	48.87	+ 1	4448.88
...	nn D	58.9028	4449.83	+20	4450.03	3	n D	50.4299	4451.15	−58	4450.57	50.30	+ 2	4450.32
...	....	....	....	....	....	0-1	nn D	50.2897	4453.99	−58	4453.41	53.21	+ 2	4453.23
1	nn D	58.6457	4455.10	+20	4455.30	2	n D	50.1773	4456.28	−58	4455.70	55.50	+ 2	4455.52
1	nn D	58.5558	4456.95	+20	4457.15	...	....	....	....	....	....	57.35	+ 2	4457.37
1	n D	58.4162	4459.84	+20	4460.04	1	n D	49.9639	4460.64	−59	4460.05	60 05	+ 2	4460.07
...	wn D	58.3197	4461.84	+19	4462.03	2	n D	49.8485	4463.01	−60	4462.41	62.22	+ 2	4462.24
...	....	....	....	....	....	B	from	49.8130	4463.70	−60	4463.10	62.90	+ 2	4462.9
...	n B	58.2285	4463.73	+19	4463.92	3	B	49.7850	4464.32	−60	4463.72	63.82	+ 2	4463.84
...	....	....	....	....	....	2	B	49.7337	4465.40	−61	4464.79	64.59	+ 2	4464.61
...	....	....	....	....	....		to	49.7060	4465.90	−61	4465.29	65.09	+ 2	4465.1
...	....	....	....	....	....	1	n D	49.6959	4466.16	−61	4465.55	65.35	+ 2	4465.37
...	....	....	....	....	....	1	n D	49.5359	4469.48	−62	4468.86	68.66	+ 2	4468.68
2	nn D	57.8730	4471.17	+19	4471.36	...	....	....	....	....	....	71.56	+ 2	4471.58
1	nn D	57.6893	4475.05	+19	4475.24	1	n D	49.2210	4476.00	−63	4475.37	75.31	+ 2	4475.33
...	....	....	....	....	....	1	nn D	48.9834	4481.03	−64	4480.39	80.19	+ 2	4480.21
3	n D	57.3620	4482.00	+19	4482.19	1	nn D	48.8964	4482.87	−64	4482.23	82.21	+ 2	4482.23
...	nn D	57.1250	4487.10	+20	4487.30	1	nn D	48.6291	4488.54	−65	4487.89	87.60	+ 2	4487.62
3	n D	57.0200	4489.35	+20	4489.55	2	nn D	48.5244	4490.78	−65	4490.13	89.84	+ 2	4489.86
3	n D	56.6895	4496.51	+21	4496.72	4	n D	48.1953	4497.84	−66	4497.18	96.95	+ 2	4496.97
...	nn D	56.4587	4501.56	+21	4501.77	1	nn D	47.9757	4502.59	−66	4501.93	01.85	+ 2	4501.87
	from	56.4250	4502.30	+21	4502.51	...	....	....	....	....	....	02.71	+ 2	4502.7
B	....	....	....	....	....	1	nn D	47.8508	4505.31	−67	4504.64	04.44	+ 2	4504.46
	to	56.2640	4506.80	+21	4506.01	...	....	....	....	....	....	06.21	+ 2	4506.2
3-4	nn D	56.2317	4506.56	+22	4506.78	...	wn D	47.7265	4508.03	−67	4507.36	07.07	+ 2	4507.09
	from	56.1860	4507.90	+22	4508.12	...	....	....	....	....	....	08.30	+ 2	4508.3
B	....	....	....	....	....	4	wn B	47.6564	4509.56	−67	4508.89	08.69	+ 2	4508.71
	....	....	....	....	....	1	nn D	47.6052	4510.69	−67	4510.02	09.82	+ 2	4509.84
	to	56.0210	4511.20	+22	4511.42	...	....	....	....	....	....	11.60	+ 2	4511.6
...	nn D	55.9620	4512.53	+22	4512.75	...	wn D	47.4534	4514.03	−67	4513.36	13.06	+ 2	4513.08
1	n B	55.7663	4516.61	+23	4516.84	2	n B	47.2719	4518.04	−67	4517.37	17.11	+ 2	4517.13
2	n D	55.7193	4517.96	+23	4518.19	2-3	n D	47.2758	4519.50	−67	4518.83	18.51	+ 2	4518.53
3	n B	55.5632	4521.47	+23	4521.70	5-6	n B	47.0622	4522.70	−67	4522.03	21.87	+ 2	4521.89
4	n D	55.5050	4522.79	+23	4523.02	4	n D	47.0011	4524.07	−67	4523.40	23.21	+ 2	4523.23
...	....	....	....	....	....		from	46.9620	4524.90	−67	4524.23	24.03	+ 2	4524.1
3-4	n B	55.4268	4524.56	+23	4524.79	B	....	....	....	....	....	24.99	+ 2	4525.01
...	....	....	....	....	....		to	46.8810	4526.80	−67	4526.13	25.93	+ 2	4526.0
...	wn D	55.3178	4527.03	+24	4527.27	...	wn D	46.8047	4528.48	−67	4527.81	27.54	+ 2	4527.56
1	n D	55.1501	4530.84	+24	4531.08	...	nn D	46.6404	4532.18	−67	4531.51	31.30	+ 2	4531.32
	from	55.0640	4532.60	+25	4532.85	...	....	....	....	....	....	33.05	+ 2	4533.1
D	Max	54.9528	4535.36	+25	4535.61	2	nn D	46.4529	4536.42	−67	4535.75	35.68	+ 2	4535.70
	to	54.9150	4536.20	+25	4536.45	...	....	....	....	....	....	36.65	+ 2	4536.7
1	B	54.8867	4536.88	+25	4537.13	3	n B	46.3675	4538.14	−67	4537.47	37.30	+ 2	4537.32
1	B	54.8070	4538.72	+25	4538.97	4	n B	46.2957	4540.00	−66	4539.34	39.16	+ 2	4539.18
...	nn D	54.7461	4540.13	+26	4540.39	3	n D	46.2280	4541.55	−66	4540.89	40.64	+ 2	4540.66
1	B	54.5893	4543.76	+27	4544.03	...	....	....	....	....	....	44.23	+ 2	4544.25

78 *SCHJELLERUP — Continued*

Plate G 344						Plate G 392						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.	t.m.	t.m.			mm.	t.m.	t.m.	t.m.	t.m.	t.m.	t.m.
3	n B	54.4395	4547.24	+27	4547.51	2	n B	45.9217	4548.60	−66	4547.94	47.73	+ 2	4547.75
...	nn D	54.3776	4543.69	+27	4548.96	3	wn D	45.8536	4550.16	−66	4549.50	49.23	+ 2	4549.25
7	wn D	54.2122	4553.57	+28	4553.85	...	wn D	45.6729	4554.36	−66	4553.70	53.77	+ 2	4553.79
...	....	....	....	....	....		from	45.5990	4556.10	−66	4555.44	55.24	+ 2	4555.3
1	n B	53.9760	4558.14	+29	4558.43	B	....	....	....	....	....	58.63	+ 2	4558.65
...	....	....	....	....	....		to	45.4110	4560.50	−65	4559.85	59.65	+ 2	4559.7
...	nn D	53.9010	4559.91	+29	4560.20	4	n D	45.3734	4561.35	−65	4560.70	60.45	+ 2	4560.47
...	....	....	....	....	....	3-4	n B	45.3065	4562.93	−65	4562.28	62.08	+ 2	4562.10
1-2	n D	53.7717	4562.99	+30	4563.29	4	n D	45.2464	4564.34	−65	4563.69	63.49	+ 2	4563.51
...	....	....	....	....	....	2	n B	45.1954	4565.54	−65	4564.89	64.69	+ 2	4564.71
1	nn D	53.6837	4565.06	+30	4565.36	1	nn D	45.1568	4566.46	−65	4565.81	65.59	+ 2	4565.61
B	from	53.6590	4565.60	+30	4565.90	B	from	45.1310	4567.10	−65	4566.45	66.25	+ 2	4566.3
	to	53.4860	4569.80	+32	4570.12		to	44.96:0	4571.10	−64	4570.46	70.26	+ 2	4570.3
...	....	....	....	....	....		from	44.9620	4571.10	−64	4570.46	70.26	+ 2	4570.3
...	n D	53.3957	4572.00	+33	4572.33		....	....	....	....	....	72.53	+ 2	4572.55
	from	53.3110	4574.00	+34	4574.34	D	....	....	....	....	....	74.54	+ 2	4574.6
D	....	....	....	....	....	1	n D	44.6688	4578.08	−64	4577.44	77.24	+ 2	4577.26
	to	53.1650	4577.50	+35	4577.85		to	44.6390	4578.80	−64	4578.16	78.01	+ 2	4578.0
...	....	....	....	....	....	2	nn B	44.5807	4580.19	−64	4579.55	79.35	+ 2	4579.37
1	nn D	53.0742	4579.78	+35	4580.13	1-2	n D	44.5286	4581.45	−64	4580.81	80.45	+ 2	4580.47
...	....	....	....	....	....	1	n B	44.4855	4582.49	−63	4581.86	81.66	+ 2	4581.68
1	nn D	52.9933	4581.75	+36	4582.11	1-2	nn D	44.4433	4583.50	−63	4582.87	82.49	+ 2	4582.51
1	n B	52.9259	4583.40	+36	4583.76	4	n B	44.3945	4584.69	−63	4584.06	83.91	+ 2	4583.93
1	B	52.8595	4585.03	+37	4585.40	...	....	....	....	....	....	85.60	+ 2	4585.62
...	....	....	....	....	....	1	n D	44.2755	4587.57	−63	4586.94	86.74	+ 2	4586.76
...	....	....	....	....	....	Max	B	44.1490	4590.65	−62	4590.03	89.83	+ 2	4589.85
1	n D	52.6253	4590.79	+38	4591.17	...	....	....	....	....	....	91.37	+ 2	4591.39
2	wn B	52.4377	4595.44	+40	4595.84	6	n B	43.8969	4596.82	−62	4596.20	96.02	+ 2	4596.04
1	nn D	52.3860	4596.70	+40	4597.10	...	....	....	....	....	....	97.30	+ 2	4597.32
...	....	....	....	....	....	1	n B	43.7630	4600.12	−61	4599.51	99.31	+ 2	4599.33
2	n D	52.2386	4600.40	+42	4600.82	2	n D	43.6968	4601.75	−61	4601.14	00.98	+ 2	4601.00
...	....	....	....	....	....	1	n D	43.6087	4603.93	−61	4603.32	03.12	+ 2	4603.14
2	n D	51.9938	4606.54	+44	4606.98	4-5	n D	43.4458	4607.98	−60	4607.38	07.18	+ 2	4607.20
D	from	52.1630	4602.30	+42	4602.72	...	....	....	....	....	....	02.92	+ 2	4602.9
	to	51.9510	4607.60	+44	4608.04	...	....	....	....	....	....	08.24	+ 2	4608.3
	Head	51.9430	4607.80	+44	4608.24		Head	43.4110	4608.80	−60	4608.20	08.22	+ 2	4608.2
2	n B	51.9159	4608.51	+44	4608.95	...	....	....	....	....	....	09.15	+ 2	4609.17
1	n D	51.8746	4609.55	+45	4610.00	...	....	....	....	....	....	10.20	+ 2	4610.22
1	n B	51.7922	4611.64	+45	4612.09	...	....	....	....	....	....	12.29	+ 2	4612.31
2	n D	51.7267	4613.30	+46	4613.76	2	n D	43.1758	4614.74	−59	4614.15	13.96	+ 2	4613.98
6	B	51.6784	4614.53	+47	4615.00	6	B	43.1268	4615.97	−59	4615.38	15.19	+ 2	4615.21
2	n D	51.6215	4615.98	+47	4616.45	3-4	D	43.0775	4617.21	−58	4616.63	16.54	+ 2	4616.56
7	B	51.5707	4617.28	+48	4617.76	6	B	43.0082	4618.96	−58	4618.38	18.07	+ 2	4618.09
6	D	51.5014	4619.05	+48	4619.53	6	D	42.9394	4620.70	−58	4620.12	19.83	+ 2	4619.85
4-5	B	51.4338	4620.78	+48	4621.26	5	n B	42.8766	4622.29	−57	4621.72	21.49	+ 2	4621.51
3	D	51.3778	4622.22	+49	4622.71	2	n D	42.8177	4623.79	−57	4623.22	22.97	+ 2	4622.99
2	n B	51.3138	4623.87	+50	4624.37	...	....	....	....	....	....	24.57	+ 2	4624.59
...	n B	51.1820	4627.20	+51	4627.71	...	....	....	....	....	....	27.91	+ 2	4627.9
...	n D	51.1090	4629.10	+51	4629.61	...	wn D	42.5514	4630.59	−56	4630.03	29.82	+ 2	4629.84
5	B	50.7546	4638.40	+54	4638.94	4	B	42.1917	4639.86	−54	4639.32	39.13	+ 2	4639.15
5	D	50.6999	4639.84	+55	4640.39	5	D	42.1359	4641.31	−54	4640.77	40.58	+ 2	4640.60
3	n B	50.6430	4641.33	+55	4641.88	3	B	42.0783	4642.81	−53	4642.28	42.08	+ 2	4642.10
1	n B	50.5783	4643.04	+56	4643.60	...	....	....	....	....	....	43.80	+ 2	4643.82
...	....	....	....	....	....	...	n D	41.9076	4647.26	−53	4646.73	46.53	+ 2	4646.55
...	nn D	50.1000	4655.76	+59	4656.35	1	n D	41.5463	4656.78	−51	4656.27	56.31	+ 2	4656.33
...	n B	49.7716	4664.60	+62	4665.22	...	....	....	....	....	....	65.42	+ 2	4665.44
1	n D	49.6567	4667.73	+62	4668.35	...	n D	41.0770	4669.30	−49	4668.81	68.58	+ 2	4668.60
1	n D	48.0038	4713.96	+72	4714.68	...	n D	39.4022	4715.60	−38	4715.22	14.95	+ 2	4714.97
Con. Spec.	from	47.9570	4715.30	+73	4716.03	...	....	....	....	....	....	16.23	+ 2	4716.3
	to	47.7840	4720.30	+74	4721.04	...	....	....	....	....	....	21.24	+ 2	4721.3
Max	B	47.9320	4716.00	+73	4716.73	...	....	....	....	....	....	16.93	+ 2	4717.0
...	n D	47.7092	4722.48	+74	4723.22	...	n D	39.1457	4722.92	−37	4722.55	22.67	+ 2	4722.69
D	from	47.3510	4732.90	+76	4733.66		Limits	38.7120	4735.40	−35	4735.05	34.±	+ 2	4734.±
	to	47.2110	4737.20	+77	4737.97		Limits	38.6130	4738.30	−34	4737.96	37.97	+ 2	4738.0
Max	D	47.2645	4735.49	+77	4736.26	10	w D	38.6618	4736.91	−35	4736.56	36.41	+ 2	4736.43

78 *SCHJELLERUP—Continued*

Plate G 344						Plate G 392						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
Con. Spec. {	from	47.2070	4737.20	+77	4737.97	Con. Spec. {	from	38.6130	4738.30	−34	4737.96	37.97	+ 2	4738.0
	to	47.0650	4741.30	+77	4742.07		to	38.4630	4742.70	−33	4742.37	42.22	+ 2	4742.2
2-3	n B	47.1801	4737.99	+77	4738.76	7	B	38.5750	4739.44	−34	4739.10	38.93	+ 2	4738.95
10	wn D	47.0048	4743.20	+77	4743.97	10	D	38.4079	4744.34	−33	4744.01	43.99	+ 2	4744.01
...	....	....	....	....	....	Limits		38.4630	4742.70	−33	4742.37	42.17	+ 2	4742.2
...	....	....	....	....	....	Limits		38.3535	4745.94	−33	4745.61	45.41	+ 2	4745.4
	Head	46.9490	4744.80	+78	4745.58		Head	38.3535	4745.94	−33	4745.61	45.41	+ 2	4745.43
B Max {	from	46.9490	4744.80	+78	4745.58	...	....	....	....	....	....	45.78	+ 2	4745.8
	B	46.9200	4745.72	+78	4746.50	...	....	....	....	....	....	46.70	+ 2	4746.72
	....	....	....	....	....	1	n D	38.2025	4750.40	−32	4750.08	49.88	+ 2	4749.90
	to	46.5340	4757.30	+80	4758.10	...	....	....	....	....	....	58.30	+ 2	4758.3
2–3	n D	46.5063	4758.16	+80	4758.96	...	wn D	37.9029	4759.31	−31	4759.00	58.98	+ 2	4759.00
...	nn D	46.2660	4765.40	+81	4766.21	1	n D	37.6422	4767.15	−30	4766.85	66.53	+ 2	4766.55
1-2	nn D	46.0522	4772.04	+81	4772.85	1-2	n D	37.4554	4772.80	−29	4772.51	72.68	+ 2	4772.70
Max	B	45.9850	4774.10	+81	4774.91	2	n B	37.3635	4775.60	−29	4775.31	75.11	+ 2	4775.13
Limits {	....	46.0190	4773.00	+81	4773.81	...	....	....	....	....	....	74.01	+ 2	4774.0
	....	45.8670	4777.70	+82	4778.52	...	....	....	....	....	....	78.72	+ 2	4778.7
...	wn D	45.6792	4783.60	+82	4784.42	2	n D	37.0603	4784.89	−28	4784.61	84.52	+ 2	4784.54
1	n D	45.5138	4788.78	+82	4789.60	1	n D	36.8884	4790.19	−27	4789.92	89.76	+ 2	4789.78
Max	B	45.3270	4794.65	+82	4795.47	Max	B	36.7042	4795.92	−27	4795.65	95.56	+ 2	4795.58
...	....	....	....	....	....	Max	B	36.4873	4802.71	−26	4802.45	02.25	+ 2	4802.27
1	n D	44.9803	4805.68	+82	4806.50	2	nn D	36.3357	4807.48	−25	4807.23	06.87	+ 2	4806.89
...	....	....	....	....	....	1	n B	36.2005	4811.77	−25	4811.52	11.32	+ 2	4811.34
1	nn D	44.8111	4811.11	+82	4811.93	...	nn D	36.1672	4812.83	−25	4812.58	12.26	+ 2	4812.28
2–3	n D	44.6939	4814.89	+82	4815.71	3	wn D	36.0481	4816.62	−25	4816.37	16.04	+ 2	4816.06
B {	from	44.6730	4815.50	+82	4816.32	B {	from	36.0130	4817.70	−25	4817.45	16.89	+ 2	4816.9
	to	44.4730	4822.00	+81	4822.81		to	35.9170	4820.80	−25	4820.55	21.68	+ 2	4821.7
Max	B	44.6003	4817.92	+82	4818.74	Max	B	35.9400	4820.08	−25	4819.83	19.29	+ 2	4819.31
2	nn D	44.4450	4822.98	+81	4823.79	...	nn D	35.8040	4824.45	−25	4824.20	24.00	+ 2	4824.02
...	....	....	....	....	....	4	n B	35.7335	4826.72	−25	4826.47	26.27	+ 2	4826.29
1-2	n D	44.3181	4827.13	+81	4827.94	3	nn D	35.6665	4828.89	−25	4828.64	28.29	+ 2	4828.31
3	wn B	44.2406	4829.67	+81	4830.48	4	B	35.5994	4831.06	−25	4830.81	30.64	+ 2	4830.66
3	D	44.1856	4831.48	+81	4832.29	6	D	35.5345	4833.12	−25	4832.87	32.59	+ 2	4832.61
...	....	....	....	....	....	1	nn B	35.1417	4846.02	−25	4845.77	45.57	+ 2	4845.59
...	....	....	....	....	....	2	n B	34.9891	4851.07	−25	4850.82	50.62	+ 2	4850.64
1	nn D	43.5980	4851.04	+78	4851.82	1	n D	34.9514	4852.32	−25	4852.07	51.95	+ 2	4851.97
1-2	nn D	43.4935	4854.57	+78	4855.35	1	n D	34.8315	4856.31	−25	4856.06	55.71	+ 2	4855.73
...	....	....	....	....	....	2	n B	34.7751	4858.19	−25	4857.94	57.74	+ 2	4857.76
...	....	....	....	....	....	1	nn D	34.7088	4860.42	−25	4860.17	59.97	+ 2	4859.99
...	....	....	....	....	....	2	nn B	34.6651	4861.88	−25	4861.63	61.43	+ 2	4861.45
1	nn D	43.1985	4864.59	+76	4865.35	...	nn D	34.5475	4865.83	−26	4865.57	65.46	+ 2	4865.48
1-2	B	43.0744	4868.84	+76	4869.60	...	....	....	....	....	....	69.80	+ 2	4869.82
2	n D	43.0238	4870.58	+75	4871.33	3-4	n D	34.3641	4872.03	−26	4871.77	71.55	+ 2	4871.57
1-2	n D	42.9047	4874.68	+74	4875.42	1-2	n D	34.2493	4875.93	−27	4875.66	75.54	+ 2	4875.56
1-2	n B	42.7844	4878.85	+74	4879.59	...	....	....	....	....	....	79.79	+ 2	4879.81
3	n D	42.7254	4880.89	+73	4881.62	3	D	34.0713	4882.02	−27	4881.75	81.69	+ 2	4881.71
1	n B	42.6705	4882.81	+73	4883.54	...	....	....	....	....	....	83.74	+ 2	4883.76
...	nn D	42.5963	4885.39	+73	4886.12	...	....	....	....	....	....	86.32	+ 2	4886.34
...	nn D	42.4570	4890.20	+72	4890.92	...	....	....	....	....	....	91.12	+ 2	4891.14
...	....	....	....	....	....	3	nn B	33.5729	4899.27	−29	4898.98	98.78	+ 2	4898.80
1	nn D	42.1798	4900.06	+69	4900.75	...	nn D	33.4900	4902.17	−29	4901.88	01.32	+ 2	4901.34
2–3	nn D	41.6290	4919.82	+66	4920.48	...	nn D	32.9357	4921.79	−32	4921.47	20.98	+ 2	4921.00
1	n D	41.4997	4924.52	+65	4925.17	...	....	....	....	....	....	25.37	+ 2	4925.39
...	nn D	41.2530	4933.50	+63	4934.13	1	n D	32.5875	4934.33	−34	4933.99	33.79	+ 2	4933.81
...	nn D	40.6280	4956.80	+58	4957.38	...	....	....	....	....	....	57.58	+ 2	4957.60

78 SCHJELLERUP

Plate G 300 1899, March 6, G.M.T. 14h8. Hour angle, W 2h0 Star good; comparison good						Plate G 384 1900, February 9, G.M.T. 18h4. Hour angle, W 2h9 Star good; comparison good						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
...	....	....	....	....	....	...	nn D	47.8443	5164.72	−42	5164.30	64.24	+2	5164.26
6	wn D	48.4927	5173.43	−47	5172.96	2	n D	47.6098	5174.04	−44	5173.60	73.28	+2	5173.30
1	n D	48.2176	5184.30	−52	5183.78	...	n D	47.3500	5184.50	−45	5184.05	83.92	+2	5183.94
1	n D	48.0636	5189.63	−54	5189.09	...	....	....	....	....	....	89.15	+2	5189.17
3	n D	47.9884	5193.44	−56	5192.88	...	wn D	47.1157	5193.96	−47	5193.49	93.19	+2	5193.21
2	n D	47.6671	5206.38	−62	5205.76	...	....	....	....	....	....	05.82	+2	5105.84
...	....	....	....	....	....	...	wn D	46.7480	5209.00	−48	5208.52	08.46	+2	5208.48
2	nn B	47.4602	5214.80	−66	5214.14	...	....	....	....	....	....	14.20	+2	5214.22
1-2	n D	47.4002	5217.26	−67	5216.59	1	n D	46.5500	5217.20	−48	5216.72	16.66	+2	5216.68
9	wn D	47.1690	5226.76	−70	5226.06	...	wn D	46.3139	5227.08	−49	5226.59	26.33	+2	5226.35
6	n D	46.9888	5234.23	−74	5233.49	1	nn D	46.1290	5234.90	−49	5234.41	33.95	+2	5233.97
6	n D	46.6577	5248.07	−79	5247.28	4	n D	45.8192	5248.03	−49	5247.54	47.41	+2	5247.43
4	wn D	46.5657	5251.95	−80	5251.15	2	nn D	45.7209	5252.24	−49	5251.75	51.45	+2	5251.47
1	nn D	46.4702	5255.99	−82	5255.17	...	....	....	....	....	....	55.23	+2	5255.25
3	n D	46.1146	5271.17	−86	5270.31	3	n D	48.2825	5271.23	−48	5270.75	70.53	+2	5270.55
2	nn B	45.8969	5280.56	−89	5279.67	...	....	....	....	....	....	79.73	+2	5279.75
1	nn D	45.8049	5284.56	−89	5283.67	...	nn D	45.0008	5283.60	−47	5283.13	83.41	+2	5283.43
4	n D	45.4899	5298.34	−92	5297.42	...	wn D	44.6710	5298.26	−47	5297.79	97.61	+2	5297.63
2	n D	45.3846	5302.98	−92	5302.06	...	....	....	....	....	....	02.12	+2	5302.14
3	nn B	45.3227	5305.72	−93	5304.79	1-2	n B	44.5083	5305.56	−46	5305.10	04.95	+2	5304.97
1	nn D	45.2647	5308.29	−93	5307.36	...	....	....	....	....	....	07.42	+2	5307.44
3	n B	45.1380	5313.93	−93	5313.00	2	n B	44.3315	5313.55	−46	5313.09	13.05	+2	5313.07
3	n D	45.0951	5315.85	−93	5314.92	2	n D	44.2847	5315.68	−46	5315.22	15.07	+2	5315.09
6	n B	45.0411	5318.26	−93	5317.33	2-3	n B	44.2285	5318.24	−45	5317.79	17.56	+2	5317.58
...	nn D	44.9791	5321.04	−93	5320.11	...	....	....	....	....	....	20.17	+2	5320.19
5	n D	44.7933	5329.42	−92	5328.50	1-2	nn D	43.9740	5329.89	−44	5329.45	28.98	+2	5329.00
5	wn B	44.6603	5335.45	−91	5334.54	2-3	n B	43.8491	5335.65	−44	5335.21	34.88	+2	5334.90
2	n D	44.6137	5337.57	−91	5336.66	1	nn D	43.8101	5337.45	−44	5337.01	36.84	+2	5336.86
5	wn B	44.5633	5339.86	−90	5338.96	2-3	n B	43.7622	5339.67	−43	5339.24	39.10	+2	5339.12
2	D	44.5122	5342.20	−90	5341.30	1-2	nn D	43.7065	5342.26	−43	5341.83	41.57	+2	5341.59
...	....	....	....	....	....	1	nn B	43.6452	5345.11	−43	5344.68	44.62	+2	5344.64
2-3	n D	44.3313	5350.50	−86	5349.64	...	wn D	43.5437	5349.88	−42	5349.46	49.55	+2	5349.57
...	....	....	....	....	....	1	n B	43.4833	5352.69	−42	5352.27	52.21	+2	5352.23
...	nn D	43.9718	5367.18	−79	5366.39	...	nn D	43.1809	5366.98	−40	5366.58	66.49	+2	5366.51
3	n B	43.9193	5369.63	−78	5368.85	...	....	....	....	....	....	68.91	+2	5368.93
6	D	43.8618	5372.33	−76	5371.57	5-6	n D	43.0726	5372.14	−39	5371.75	71.66	+2	5371.68
7	B	43.7877	5375.82	−74	5375.08	2	n B	43.0051	5375.36	−39	5374.97	75.03	+2	5375.05
2	n D	43.7409	5378.02	−73	5377.30	2	n D	42.9539	5377.82	−39	5377.43	77.36	+2	5377.38
9	wn B	43.6727	5381.24	−70	5380.54	2	wn B	42.8934	5380.73	−38	5380.35	80.45	+2	5380.47
...	wn D	43.5840	5385.44	−65	5384.79	...	....	....	....	....	....	84.85	+2	5384.87
...	....	....	....	....	....	1	nn D	42.6847	5390.81	−37	5390.44	90.38	+2	5390.40
9	wn D	43.3332	5397.40	−59	5396.81	6-8	wn D	42.5508	5397.32	−36	5396.96	96.89	+2	5396.91
2	nn D	43.0561	5410.76	−52	5410.24	...	nn D	42.2907	5410.08	−35	5409.73	09.99	+2	5410.01
1	n D	42.9725	5414.82	−50	5414.32	...	....	....	....	....	....	14.38	+2	5414.40
7-8	n B	42.9139	5417.67	−48	5417.19	2-3	n B	42.1373	5417.66	−34	5417.32	17.26	+2	5417.28
3	n D	42.8416	5421.20	−46	5420.74	3	n D	42.0780	5420.61	−34	5420.27	20.51	+2	5420.53
2	n B	42.7938	5423.50	−45	5423.05	...	....	....	....	....	....	23.11	+2	5423.13
3	n D	42.6488	5430.67	−42	5430.25	2-3	n D	41.8787	5430.57	−33	5430.24	30.25	+2	5430.27
2	n D	42.5633	5434.89	−40	5434.49	...	....	....	....	....	....	34.55	+2	5434.57
B {	from	42.4610	5440.00	−38	5439.62	...	....	....	....	....	....	39.68	+2	5439.7
B	....	....	....	....	....	Max	B	41.6340	5442.90	−32	5442.58	42.52	+2	5442.54
	to	42.3340	5446.30	−36	5445.94	...	....	....	....	....	....	46.00	+2	5446.0
9	n D	42.2944	5448.25	−35	5447.90	8	n D	41.5415	5447.62	−32	5447.30	47.60	+2	5447.62
...	....	....	....	....	....	B {	from	41.5070	5449.36	−32	5449.04	48.98	+2	5449.0
Max	B	42.2328	5451.34	−34	5451.00	B	....	....	....	....	....	51.06	+2	5451.08
...	....	....	....	....	....		to	41.3880	5455.44	−31	5455.13	55.07	+2	5455.1
1-2	n D	42.1175	5457.14	−32	5456.82	...	nn D	41.3565	5457.07	−31	5456.76	56.79	+2	5456.81
1-2	n D	42.0339	5461.36	−31	5461.05	1	nn D	41.2772	5461.14	−31	5460.83	60.94	+2	5460.96
2	n D	41.8930	5468.50	−30	5468.20	...	wn D	41.1319	5468.65	−30	5468.35	68.28	+2	5468.30
2	n B	41.8084	5472.84	−29	5472.55	...	....	....	....	....	....	72.61	+2	5472.63
...	....	....	....	....	....	1	nn D	41.0135	5474.80	−30	5474.50	74.44	+2	5474.46
...	....	....	....	....	....	1	nn D	40.9408	5478.59	−30	5478.29	78.23	+2	5478.25
1	n D	41.5984	5483.57	−27	5483.30	1	nn D	40.8503	5483.33	−30	5483.03	83.17	+2	5483.19
...	....	....	....	....	....	D {	from	40.5890	5497.10	−29	5496.81	96.75	+2	5496.8
3-4	n D	41.3067	5498.69	−25	5498.44	D	....	....	....	....	....	98.20	+2	5498.22
...	....	....	....	....	....		to	40.4560	5504.20	−29	5503.91	03.85	+2	5503.9

78 *SCHJELLERUP—Continued*

Plate G 300						Plate G 384						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
3	n B	41.0955	5509.74	−23	5509.51	...	....	....	....	....	....	09.57	+2	5509.59
3	n D	41.0422	5512.55	−23	5512.32	...	nn D	40.2948	5512.81	−29	5512.52	12.42	+2	5512.44
1-2	nn D	40.7966	5525.56	−22	5525.34	...	wn D	40.0551	5525.80	−28	5525.52	25.43	+2	5525.45
1	nn D	40.6240	5534.76	−22	5534.54	...	....	....	....	....	....	34.60	+2	5534.62
...	....	......	....	....	....	1	B	39.8639	5536.17	−28	5535.89	35.83	+2	5535.85
8	w D	40.5270	5540.00	−22	5539.78	6-8	D	39.8020	5539.56	−28	5539.28	39.53	+2	5539.55
B	from	40.4820	5542.40	−22	5542.18	B	from	39.7530	5542.30	−28	5542.02	42.10	+2	5542.1
	to	40.3890	5547.50	−22	5547.28		to	39.6560	5547.60	−28	5547.32	47.30	+2	5547.3
2	n D	40.3678	5548.61	−22	5548.39	1	n D	39.6299	5549.05	−28	5548.77	48.58	+2	5548.60
1	n D	40.2939	5552.62	−22	5552.40	0-1	nn D	39.5635	5552.73	−28	5552.45	52.43	+2	5552.45
1	n D	40.2238	5556.44	−22	5556.22	0-1	nn D	39.4905	5556.78	−28	5556.50	56.36	+2	5556.38
...	n D	40.1000	5563.20	−22	5562.98	0-1	nn D	39.3853	5562.65	−28	5562.37	62.68	+2	5562.70
1-2	n D	40.0241	5567.39	−22	5567.17	1	n D	39.2985	5567.52	−28	5567.24	67.21	+2	5567.23
1	n D	39.9680	5570.50	−22	5570.28	...	....	....	....	....	....	70.34	+2	5570.36
...	....	....	....	....	....	D	from	39.1860	5573.90	−28	5573.62	73.56	+2	5573.6
1	n D	39.8936	5574.59	−22	5574.37	D	....	....	....	....	....	74.43	+2	5574.45
Max	D	39.7204	5584.21	−22	5583.99	6	D	39.0016	5584.29	−28	5584.01	84.00	+2	5584.02
...	....	....	....	....	....		to	38.9680	5586.20	−28	5585.92	85.84	+2	5585.9
Head		39.6840	5586.22	−22	5586.00	Head		38.9670	5586.30	−28	5586.02	86.01	+2	5586.03
3	B	39.6628	5587.43	−22	5587.21	3	B	38.9456	5587.48	−28	5587.20	87.21	+2	5587.23
1	nn D	39.6240	5589.61	−22	5589.39	1	n D	38.9122	5589.38	−28	5589.10	89.25	+2	5589.27
2-3	n B	39.5700	5592.63	−23	5592.40	3	n B	38.8661	5592.03	−28	5591.75	92.08	+2	5592.10
2	n D	39.5227	5595.29	−23	5595.06	2	n D	38.8111	5595.18	−28	5594.90	94.96	+2	5594.98
4	B	39.4770	5597.87	−23	5597.64	3	B	38.7651	5597.82	−28	5597.54	97.59	+2	5597.61
1	nn D	39.4206	5601.05	−24	5600.81	1-2	nn D	38.7239	5600.19	−28	5599.91	00.36	+2	5600.38
D	from	39.3020	5607.80	−24	5607.56	...	....	....	....	....	....	07.62	+2	5607.6
D	....	....	....	....	....	...	nn D	38.5591	5609.72	−28	5609.44	09.50	+2	5609.52
	to	39.2230	5612.30	−24	5612.06	...	....	....	....	....	....	12.12	+2	5612.1
	from	39.1080	5618.80	−25	5618.55	...	....	....	....	....	....	18.61	+2	5618.6
Max	D	39.0838	5620.23	−25	5619.98	2	n D	38.3739	5620.51	−28	5620.33	20.16	+2	5620.18
Max	D	38.9900	5625.60	−25	5625.35	...	nn D	38.2854	5625.70	−28	5625.42	25.36	+2	5625.38
	to	38.9600	5627.30	−26	5627.04	...	....	....	....	....	....	27.10	+2	5627.1
8	D	38.8405	5634.26	−26	5634.00	10	D	38.1328	5634.70	−28	5634.42	34.21	+2	5634.23
Head		38.7964	5636.81	−26	5636.55	Head	....	38.0896	5637.26	−28	5636.98	36.77	+2	5636.79
	from	38.7964	5636.81	−26	5636.55	...	....	....	....	....	....	36.77	+2	5636.8
B 8	n B	38.7658	5638.60	−27	5638.33	...	B	38.0571	5639.19	−28	5638.91	38.62	+2	5638.64
6	n B	38.7102	5641.84	−27	5641.57	...	B	38.0102	5641.97	−29	5641.68	41.63	+2	5641.65
	to	38.6950	5642.70	−27	5642.43	...	....	....	....	....	....	42.49	+2	5642.5
2	nn D	38.6625	5644.62	−28	5644.34	1	n D	37.9680	5644.49	−29	5644.20	44.27	+2	5644.29
1	nn D	38.5603	5650.61	−28	5650.33	1	nn D	37.8694	5650.39	−29	5650.10	50.22	+2	5650.24
...	nn B	38.5130	5653.40	−28	5653.12	...	....	....	....	....	....	53.18	+2	5653.2
...	....	....	....	....	....	2	n B	37.7830	5655.57	−29	5655.28	55.22	+2	5655.24
...	nn D	38.4306	5658.25	−29	5657.96	1	n D	37.7503	5657.54	−29	5657.25	57.61	+2	5657.63
3	nn D	38.2098	5671.35	−31	5671.04	2	n D	37.5132	5671.89	−30	5671.59	71.32	+2	5671.34
2	nn B	38.1633	5674.13	−32	5673.81	1-2	n B	37.4736	5674.31	−30	5674.01	73.91	+2	5673.93
1-2	nn D	38.1202	5676.70	−32	5676.38	2	n D	37.4327	5676.81	−30	5676.51	76.45	+2	5676.47
2	n B	38.0704	5679.69	−32	5679.37	...	....	....	....	....	....	79.43	+2	5679.45
1-2	n B	37.9977	5684.06	−33	5683.73	...	....	....	....	....	....	83.79	+2	5683.81
8	wn B	37.8353	5693.88	−34	5693.54	6	n B	37.1484	5694.30	−31	5693.99	93.77	+2	5693.79
1	nn D	37.7910	5696.60	−35	5696.25	...	....	....	....	....	....	96.31	+2	5696.33
4	n B	37.6508	5705.12	−36	5704.76	5	n B	36.9668	5705.60	−31	5705.29	05.03	+2	5705.05
3-4	n D	37.6018	5708.12	−37	5707.75	2	n D	36.9191	5708.58	−31	5708.27	08.01	+2	5708.03
1	nn D	37.5210	5713.10	−37	5712.73	1	n D	36.8338	5713.93	−32	5713.61	13.17	+2	5713.19
6	wn B	37.4514	5717.37	−38	5716.99	8	wn B	36.7734	5717.74	−32	5717.42	17.21	+2	5717.23
1	n D	37.3829	5721.61	−39	5721.22	2	n D	36.7063	5721.97	−32	5721.65	21.44	+2	5721.46
6	wn B	37.3330	5724.70	−39	5724.31	6	wn B	36.6566	5725.12	−32	5724.80	24.56	+2	5724.58
3-4	n D	37.2257	5731.38	−40	5730.98	8	wn D	36.5441	5732.27	−33	5731.94	31.46	+2	5731.48
...	....	....	....	....	....	D	from	36.3830	5742.60	−33	5742.27	42.21	+2	5742.2
3	n D	37.0343	5743.37	−43	5742.94	D	....	....	....	....	....	43.00	+2	5743.02
2	nn D	36.9297	5750.00	−44	5749.56	1	n D	36.2611	5750.44	−34	5750.10	49.83	+2	5749.85
...	....	....	....	....	....		to	36.2490	5751.20	−34	5750.86	50.80	+2	5750.8
3	nn D	36.7301	5762.66	−46	5762.20	1	n D	36.0743	5762.56	−35	5762.21	62.21	+2	5762.23
3	nn D	36.6045	5770.70	−48	5770.22	3	n D	36.9375	5771.51	−35	5771.16	70.69	+2	5770.71

78 *SCHJELLERUP—Continued*

Plate G 300						Plate G 384						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
B {	from	36.5790	5772.30	−50	5771.80	...	....	....	....	....	....	71.86	+2	5771.9
} (	to	36.4460	5780.90	−50	5780.40	...	....	....	....	....	....	80.46	+2	5780.5
D {	......	....	....	....	....	3	wn D	35.7232	5785.63	−36	5785.27	85.21	+2	5785.23
(	to	36.3620	5786.30	−50	5785.80	...	....	....	....	....	....	85.86	+2	5785.9
1	nn D	36.3005	5790.36	−51	5789.85	...	....	....	....	....	....	89.91	+2	5789.93
2	n D	36.1827	5798.05	−52	5797.53	...	....	....	....	....	....	97.59	+2	5797.61
1	nn D	36.0953	5803.79	−53	5803.26	1-2	n D	35.4446	5804.24	−38	5803.86	03.56	+2	5803.58
1	nn D	35.8080	5822.80	−60	5822.20	1	nn D	35.1549	5823.87	−39	5823.48	22.84	+2	5822.86
1	n D	35.3991	5850.34	−60	5849.74	...	....	....	....	....	....	49.80	+2	5849.82

132 *SCHJELLERUP = U HYDRAE*

Plate A 328 1902, February 21, G.M.T. $18^{h}3$ Hour angle, E $0^{h}7$ Star excellent; comparison fair						Plate G 309 1899, March 23, G.M.T. $17^{h}8$ Hour angle, W $1^{h}4$ Star fair; comparison fair						Plate G 368 1899, December 29, G.M.T. $22^{h}1$ Hour angle, W $0^{h}2$ Star fair; comparison fair						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Form.	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Form.	Cor. from Curve	Wave-Length	Uncor. for Velocity	Cor. for V	Cor. for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
Spec.	begins	22.4500	4295.9	+3±	4296.2	...	...	...	...	...	...	...	...	...	...	...	...	96.2	+40	4296.6
....	...	...	...	...	...	Begi	ns	63.9510	76.84	− 3	76.81	Begi	ns	57.6150	71.3	+39	71.7	74.	+41	4374.
....	...	...	...	...	...	...	...	...	...	...	...	1	nn D	57.4080	75.1	+38	75.5	75.5	+41	4375.9
....	...	...	...	...	...	...	...	...	...	...	...	1	nn D	57.1090	80.6	+36	81.0	81.0	+41	4381.4
....	...	...	...	...	...	1	n D	63.5061	84.90	− 7	84.83	...	...	...	...	...	...	84.83	+41	4385.2
2	n B	30.9127	4388.25	+11	4388.36	...	...	...	...	...	...	...	...	...	...	...	...	88.36	+41	4388.77
....	wn D	30.9927	4389.19	+11	4389.30	1-2	n D	63.2453	89.60	− 8	89.52	1	n D	56.6559	88.94	+33	89.27	89.36	+41	4389.77
2	n D	31.1845	4391.44	+10	4391.54	...	...	...	...	...	...	...	...	...	...	...	...	91.54	+41	4391.95
2	n B	31.2402	4392.33	+10	4392.43	...	...	...	...	...	...	...	...	...	...	...	...	92.43	+41	4392.84
....	wn D	31.4565	4394.65	+10	4394.75	...	w D	62.9775	94.50	− 9	94.41	...	wn D	56.3620	94.50	+31	94.81	94.66	+41	4395.07
Con. {	from	31.5080	4395.26	+ 9	4395.35	...	...	...	...	...	...	...	...	...	...	...	...	95.35	+41	4395.76
Spec. }	to	31.6885	4397.40	+ 9	4397.49	...	...	...	...	...	...	...	...	...	...	...	...	97.49	+41	4397.90
1-2	n D	31.7174	4397.74	+ 9	4397.83	...	...	...	...	...	...	...	...	...	...	...	...	97.83	+41	4398.24
....	wn D	31.9405	4400.39	+ 8	4400.47	1-2	n D	62.6435	00.70	−11	00.59	...	wn D	56.0649	00.08	+29	00.37	00.48	+41	4400.89
8	n B	32.0714	4401.96	+ 7	4402.03	2	B	62.5620	02.21	−12	02.09	...	...	...	...	...	...	02.06	+41	4402.47
4	D	32.1442	4402.83	+ 6	4402.89	...	...	...	...	...	...	...	...	...	...	...	...	02.89	+41	4403.30
....	nn D	32.2810	4404.46	+ 6	4404.52	1-2	n D	62.4060	05.12	+13	04.99	...	wn D	55.8:80	04.70	+28	04.98	04.83	+41	4405.24
7	D	32.5915	4408.20	+ 5	4408.25	1	n D	62.2470	08.10	−14	07.96	...	wn D	55.6610	07.80	+28	08.08	08.10	+41	4408.51
1	n D	32.8023	4410.74	+ 5	4410.79	...	...	...	...	...	...	...	...	...	...	...	...	10.79	+41	4411.20
5	D	32.8915	4411.82	+ 4	4411.86	...	...	...	...	...	...	1	nn D	55.4675	11.52	+26	11.78	11.82	+41	4412.23
Con. {	from	32.9290	4412.30	+ 4	4412.34	...	...	...	...	...	...	...	...	...	...	...	...	12.34	+41	4412.8
Spec. }	to	33.0905	4414.24	+ 3	4414.27	...	...	...	...	...	...	...	...	...	...	...	...	14.27	+41	4414.7
3	D	33.1225	4414.63	+ 3	4414.66	1	n D	61.8679	15.25	−17	15.08	...	...	...	...	...	...	14.87	+41	4415.28
2	D	33.2569	4416.27	+ 3	4416.30	...	...	...	...	...	...	...	...	...	...	...	...	16.30	+41	4416.71
1	n D	33.3415	4417.30	+ 3	4417.33	...	...	...	...	...	...	...	...	...	...	...	...	17.33	+41	4417.74
Con. {	from	33.3605	4417.53	+ 3	4417.56	...	...	...	...	...	...	...	...	...	...	...	...	17.56	+41	4418.0
Spec. }	to	33.5515	4419.87	+ 2	4419.89	...	...	...	...	...	...	...	...	...	...	...	...	19.89	+41	4420.3
2	n D	33.5760	4420.17	+ 2	4420.19	...	...	...	...	...	...	...	...	...	...	...	...	20.19	+41	4420.60
2	n B	33.6228	4420.75	+ 2	4420.77	...	...	...	...	...	...	...	...	...	...	...	...	20.77	+41	4421.18
2-3	D	33.6657	4421.27	+ 2	4421.29	...	...	...	...	...	...	...	...	...	...	...	...	21.29	+41	4421.70
3	n B	33.8522	4423.57	+ 1	4423.58	...	...	...	...	...	...	...	...	...	...	...	...	23.58	+41	4423.99
5-6	D	34.0085	4425.49	+ 1	4425.50	...	...	...	...	...	...	1	nn D	54.7675	25.17	+22	25.39	25.45	+41	4425.86
6	B	34.0723	4426.28	0	4426.28	...	...	...	...	...	...	...	...	...	...	...	...	26.28	+41	4426.69
6	D	34.1314	4427.02	0	4427.02	1-2	n D	61.2244	27.57	−20	27.37	1	nn D	54.6658	27.32	+21	27.53	27.31	+41	4427.75
(	from	34.310C	4429.23	0	4429.23	...	...	...	...	...	...	...	...	...	...	...	...	29.23	+41	4429.6
D {	......	...	...	...	...	1-2	n D	61.0856	30.25	−21	30.04	2	n D	54.5489	29.49	+20	29.69	29.87	+41	4430.28
(	to	34.4115	4430.49	− 1	4430.48	...	...	...	...	...	...	...	...	...	...	...	...	30.48	+41	4430.9
Con. {	from	34.4115	4430.49	− 1	4430.48	...	...	...	...	...	...	...	...	...	...	...	...	30.48	+41	4430.9
}	......	...	...	...	...	...	...	...	...	...	...	1	n D	54.3559	33.32	+19	33.51	33.51	+41	4433.92
Spec (	to	34.7375	4434.56	− 1	4434.55	...	...	...	...	...	...	...	...	...	...	...	...	34.55	+41	4435.0
....	D	34.7762	4435.05	− 1	4435.04	...	wn D	60.8135	35.55	−23	35.32	3	n D	54.2707	35.02	+19	35.21	35.19	+41	4435.60
Lim-	{	34.7375	4434.56	− 1	4434.55	...	...	...	...	...	...	...	...	...	...	...	...	34.55	+41	4435.0
its	}	34.8460	4435.92	− 1	4435.91	...	...	...	...	...	...	...	...	...	...	...	...	35.91	+41	4436.3
7	D	34.9934	4437.77	− 2	4437.75	0-1	D	60.6908	37.95	−24	37.71	...	...	...	...	...	...	37.73	+41	4438.14
4	n B	35.0485	4438.47	− 2	4438.45	...	...	...	...	...	...	...	...	...	...	...	...	38.45	+41	4438.96
Con.	Spec.	...	...	...	...	1-2	n D	60.4585	42.52	−25	42.27	...	...	...	...	...	...	42.27	+41	4442.68
6	D	35.4944	4444.10	− 3	4444.07	1	n D	60.3642	44.38	−26	44.12	...	...	...	...	...	...	44.10	+41	4444.51
5	B	35.5475	4444.78	− 3	4444.75	...	...	...	...	...	...	...	...	...	...	...	...	44.75	+41	4445.16
2	D	35.5897	4445.31	− 4	4445.27	...	...	...	...	...	...	...	...	...	...	...	...	45.27	+41	4445.68
3	n B	35.6267	4445.77	− 4	4445.73	...	...	...	...	...	...	...	...	...	...	...	...	45.73	+41	4446.14
....	......	...	...	...	...	2	nn D	60.2085	47.47	−26	47.21	1-2	n D	53.6950	46.70	+15	46.85	47.03	+41	4447.44
8	n B	:5.8222	4448.28	− 4	4448.24	...	...	...	...	...	...	...	...	...	...	...	...	48.24	+41	4448.65
....	......	...	...	...	...	2-3	n D	60.0866	49.89	−27	49.62	2	n D	53.5532	49.50	+14	49.64	49.63	+41	4450.04
1-2	n D	36.2067	4453.20	− 5	4453.15	1	nn D	59.9270	53.06	−28	52.78	1	n D	53.4048	52.53	+14	52.67	52.87	+42	4453.29
5	B	36.2580	4453.86	− 5	4753.81	...	...	...	...	...	...	...	...	...	...	...	...	53.81	+42	4454.23

132 *SCHJELLERUP — Continued*

Plate A 328						Plate G 309						Plate G 368						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Form.	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Form.	Cor. from Curve	Wave-Length	Uncor. for Velocity	Cor. for V	Cor. for Velocity
		mm.	t.m.		t.m			mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
3	D	36.3140	4454.58	− 5	4454.53	2	D	59.8036	55.56	−29	55.27	1	n D	53.2945	54.79	+13	54.92	54.91	+42	4455.33
0–1	D	36.4540	4456.40	− 6	4456.34	....	....	....	....	....	....	....	....	....	....	....	....	56.34	+42	4456.76
4	n B	36.6134	4458.45	− 6	4458.39	....	....	....	....	....	....	....	....	....	....	....	....	58.39	+42	4458.81
D	from	36.6530	4458.96	− 6	4458.90	....	....	....	....	....	....	....	....	....	....	....	....	58.90	+42	4459.3
	to	36.7460	4460.17	− 6	4460.11	....	....	....	....	....	....	....	....	....	....	....	....	60.11	+42	4460.5
8	w D	36.8570	4461.61	− 6	4461.55	....	w D	59.4780	62.10	−30	61.80	....	....	....	....	....	....	61.68	+42	4462.10
....	....	....	....	....	....	B	from	59.4390	62.90	−31	62.59	....	....	....	....	....	....	62.59	+42	4463.0
8	B	37.0188	4463.71	− 6	4463.65		mid	59.3906	63.90	−31	63.59	2	n B	52.8815	63.62	+11	63.73	63.66	+42	4464.08
....	....	....	....	....	....		to	59.3520	64.70	−31	64.39	....	....	....	....	....	....	64.39	+42	4464.8
1	n D	37.1487	4465.41	− 7	4465.34	....	....	....	....	....	....	....	....	....	....	....	....	65.34	+42	4465.76
2	D	37.2358	4466.55	− 7	4466.48	....	....	....	....	....	....	....	....	....	....	....	....	66.48	+42	4466.90
1	D	37.3822	4468.60	− 7	4468.53	....	....	....	....	....	....	....	n D	52.6320	68.60	+ 9	68.69	68.61	+42	4469.02
2	n D	37.6025	4471.37	− 7	4471.30	....	....	....	....	....	....	....	....	....	....	....	....	71.30	+42	4471.72
2	B	37.6492	4471.97	− 7	4471.90	....	....	....	....	....	....	....	....	....	....	....	....	71.90	+42	4472.32
3	D	37.6977	4472.62	− 7	4472.55	....	....	....	....	....	....	....	....	....	....	....	....	72.55	+42	4472.97
....	....	....	....	....	....	B	from	58.9530	72.90	−33	72.57	....	....	....	....	....	....	72.57	+42	4473.0
4–5	B	37.7424	4473.21	− 8	4473.13		....	....	....	....	....	....	....	....	....	....	....	73.13	+42	4473.55
1	n B	37.8055	4474.05	− 8	4473.97		Max	58.8770	74.43	−33	74.10	....	....	....	....	....	....	74.04	+42	4474.46
....	....	....	....	....	....		to	58.8530	74.90	−33	74.57	....	....	....	....	....	....	74.57	+42	4475.0
....	....	....	....	....	....	....	....	....	....	....	....	1	nn D	52.3330	74.80	+ 9	74.89	74.89	+42	4475.31
1	D	37.9387	4475.81	− 8	4475.73	1	n D	58.8281	75.44	−34	75.10	....	....	....	....	....	....	75.42	+42	4475.84
4	n B?	38.1660	4478.83	− 9	4478.74	....	....	....	....	....	....	2–3	B	52.1582	78.50	+ 8	78.58	78.66	+42	4479.08
2–3	n D	38.2185	4479.53	− 9	4479.44	2–3	n D	58.5924	80.32	−35	79.97	....	....	....	....	....	....	79.71	+42	4480.13
5	D	38.4142	4482.15	− 9	4482.06	2–3	n D	58.4879	82.50	−35	82.15	1	n D	51.9957	81.96	+ 8	82.04	82.08	+42	4482.50
Con. Spec.	from	38.4550	4482.70	− 9	4482.61	....	....	....	....	....	....	....	....	....	....	....	....	82.61	+42	4483.0
	to	....	....	....	....	1	B	58.4417	83.46	−35	83.11	1	B	51.9518	82.89	+ 8	82.97	83.04	+42	4483.46
5	n B	38.6939	4485.90	− 9	4485.81	....	....	....	....	....	....	1	B	51.8269	85.56	+ 8	85.64	85.73	+42	4486.15
3	n D	38.7742	4486.98	− 9	4486.89	1–2	n D	58.2556	87.36	−36	87.00	1	n D	51.7712	86.76	+ 8	86.84	86.91	+42	4487.33
1	n B	38.8179	4487.57	− 9	4487.48	....	....	....	....	....	....	....	....	....	....	....	....	87.48	+42	4487.92
5	n B	38.8790	4488.39	−10	4488.29	....	....	....	....	....	....	1–2	B	51.7048	88.18	+ 7	88.25	88.27	+42	4488.69
3	D	38.9655	4489.56	−10	4489.46	3	n D	58.1421	89.75	−37	89.38	2	n D	51.6606	89.13	+ 7	89.20	89.35	+42	4489.77
Con. Spec.	from	39.0005	4490.04	−10	4489.94	....	....	....	....	....	....	....	....	....	....	....	....	89.94	+42	4490.4
	to	39.4300	4495.90	−10	4495.80	....	....	....	....	....	....	....	....	....	....	....	....	95.80	+42	4496.2
8	w D	39.4790	4496.54	−10	4496.44	6	n D	57.7964	97.07	−38	96.69	2–3	n D	51.3182	96.54	+ 7	96.61	96.57	+42	4496.99
Con. Spec.	from	39.5600	4497.64	−10	4497.54	....	....	....	....	....	....	....	....	....	....	....	....	97.54	+42	4498.0
	to	39.8015	4500.95	−10	4500.85	....	....	....	....	....	....	....	....	....	....	....	....	00.85	+42	4501.3
8	w D	39.8505	4501.62	−10	4501.52	1–2	n D	57.5780	01.70	−38	01.32	....	nn D	51.0890	01.60	+ 6	01.66	01.50	+42	4501.92
3	n B	39.9327	4502.75	−10	4502.65	B	from	57.536	02.60	−39	02.21	Max	B	51.0351	02.72	+ 6	02.78	02.72	+42	4503.14
3	n B	40.0289	4504.07	−10	4503.97		....	....	....	....	....	....	....	....	....	....	....	03.97	+42	4504.39
3–4	n B?	40.1240	4505.39	−10	4505.29		....	....	....	....	....	....	....	....	....	....	....	05.29	+42	4505.71
....	....	....	....	....	....		to	57.3770	06.00	−39	05.61	....	....	....	....	....	....	05.61	+42	4506.0
2	n D	40.2382	4506.97	−10	4506.87	2	nn D	57.3290	07.10	−39	06.71	....	wn D	50.8649	06.46	+ 6	06.52	06.70	+42	4507.12
B	from	40.3105	4507.97	−10	4507.87	....	....	....	....	....	....	....	....	....	....	....	....	07.87	+42	4508.3
	....	....	....	....	....	....	....	....	....	....	....	Max	B	50.7875	08.17	+ 6	08.23	08.23	+42	4508.65
	to	40.3940	4509.13	−10	4509.03	....	....	....	....	....	....	....	....	....	....	....	....	09.03	+42	4509.5
3	n D	40.4252	4509.57	−10	4509.47	1	nn D	57.2020	09.80	−39	09.41	....	....	....	....	....	....	09.47	+42	4509.89
3	n B?	40.4815	4510.34	−10	4510.24	....	....	....	....	....	....	....	....	....	....	....	....	10.24	+42	4510.66
2	n D	40.6326	4512.45	−10	4512.35	....	....	....	....	....	....	....	wn D	50.5960	12.41	+ 6	12.47	12.41	+42	4512.83
....	nn D	40.7550	4514.15	−10	4514.05	....	....	....	....	....	....	....	....	....	....	....	....	14.05	+42	4514.47
1	n D?	40.8884	4516.02	−10	4515.92	....	....	....	....	....	....	....	....	....	....	....	....	15.92	+42	4516.34
4	n B	40.9572	4516.99	−10	4516.89	....	....	....	....	....	....	....	....	....	....	....	....	16.89	+42	4517.31
3	D	41.0137	4517.77	−10	4517.67	1	n D	56.8076	18.43	−39	18.04	2	nn D	50.3450	18.01	+ 7	18.08	17.93	+42	4518.35
1	n D	41.1986	4520.38	−10	4520.28	1	n D	56.7000	20.70	−40	20.30	....	....	....	....	....	....	20.29	+42	4520.71
B	from	41.2135	4520.59	−10	4520.49	....	....	....	....	....	....	....	....	....	....	....	....	20.49	+42	4520.9
	....	....	....	....	....	2	n B	56.6586	21.70	−40	21.30	3–4	B	50.1989	21.28	+ 7	21.35	21.33	+42	4521.75
	to	41.3175	4522.06	−10	4521.96	....	....	....	....	....	....	....	....	....	....	....	....	21.96	+42	4522.4
6	D	41.3615	4522.67	−10	4522.57	....	w D	56.5892	23.23	−40	22.83	4	D	50.1327	22.78	+ 7	22.85	22.75	+42	4523.17
B	from	41.4100	4523.40	−10	4523.30	....	....	....	....	....	....	B	from	50.0990	23.60	+ 7	23.67	23.49	+43	4523.9
	B	41.4795	4524.35	− 9	4524.26	....	....	....	....	....	....		....	....	....	....	....	24.26	+42	4524.68
	to	41.6590	4526.90	− 9	4526.81	....	....	....	....	....	....		to	49.9980	26.90	+ 7	26.97	26.89	+42	4527.3
3	D	41.7627	4528.36	− 9	4528.27	....	....	....	....	....	....	....	....	....	....	....	....	28.27	+42	4528.69
....	....	....	....	....	....	....	....	....	....	....	....	1	n D	49.7810	30.80	+ 7	30.87	30.87	+42	4531.29
3	n D	42.0940	4533.10	− 8	4533.02	....	....	....	....	....	....	....	....	....	....	....	....	33.02	+42	4533.44
1	n D	42.1903	4534.48	− 8	4534.40	....	....	....	....	....	....	....	....	....	....	....	....	34.40	+42	4534.82
6–8	D	42.2774	4535.73	− 8	4535.65	....	....	....	....	....	....	....	n D	49.5723	35.50	+ 8	35.58	35.62	+42	4536.04
....	....	....	....	....	....	....	....	....	....	....	....	B	from	49.5480	36.10	+ 8	36.18	36.18	+42	4536.6
2	B	42.3397	4536.63	− 8	4536.55	....	....	....	....	....	....		....	....	....	....	....	36.55	+42	4536.97
2–3	B	42.3754	4537.14	− 8	4537.06	3	n B	55.9532	37.39	−40	36.99		....	....	....	....	....	37.03	+42	4537.45
5–6	n B	42.4800	4538.65	− 8	4538.57	3	B	55.8823	38.99	−40	38.59		....	....	....	....	....	38.58	+42	4539.00
....	....	....	....	....	....	....	....	....	....	....	....		to	49.4000	39.50	+ 8	39.58	39.58	+42	4540.0
....	wn D	42.5743	4540.01	− 8	4539.93	3	n D	55.8148	40.51	−39	40.12	....	nn D	49.3790	40.00	+ 8	40.08	40.04	+42	4540.46
2	n D	42.7230	4542.16	− 7	4542.09	....	....	....	....	....	....	....	....	....	....	....	....	42.09	+42	4542.51
Max	B	42.8470	4544.00	− 7	4543.93	....	....	....	....	....	....	....	....	....	....	....	....	43.93	+42	4544.4
2	n D	42.8885	4544.57	− 7	4544.50	....	....	....	....	....	....	....	....	....	....	....	....	44.50	+42	4544.92
....	....	....	....	....	....	2	nn D	55.5850	45.72	−39	45.33	4–5	n D	49.1421	45.42	+ 9	45.51	45.42	+42	4545.84
1	n D?	43.0350	4546.70	− 7	4546.63	....	....	....	....	....	....	....	....	....	....	....	....	46.63	+42	4547.05
5–6	B	43.0724	4547.25	− 6	4247.19	....	....	....	....	....	....	4	B	49.0685	47.13	+ 9	47.22	47 21	+42	4547.63
D	from	43.1490	4548.40	− 6	4548.34	....	....	....	....	....	....	....	....	....	....	....	....	48.34	+42	4548.8
	....	....	....	....	....	1	nn D	55.4221	49.43	−38	49.05	....	....	....	....	....	....	49.05	+42	4549.47
	to	43.2410	4549.70	− 6	4549.64	....	....	....	....	....	....	....	....	....	....	....	....	49.64	+42	4550.1
B	from	....	....	....	4549.64	....	....	....	....	....	....	....	....	....	....	....	....	49.64	+42	4550.1
	Max	43.2687	4550.12	− 5	4550.07	....	....	....	....	....	....	1	B	48.9236	50.51	+10	50.61	50.34	+43	4550.77
	to	43.3860	4551.90	− 5	4551.85	....	....	....	....	....	....	....	....	....	....	....	....	51.85	+42	4552.3
....	....	....	....	....	....	D	from	55.3060	52.00	−38	51.62	....	....	....	....	....	....	51.62	+43	4552.1
....	nn D	43.4294	4552.48	− 5	4552.43		....	....	....	....	....	....	....	....	....	....	....	52.42	+43	4552.85
4	n D	43.5284	4553.94	− 5	4553.89		....	....	....	....	....	....	w D	48.7930	53.57	+10	53.67	53.78	+43	4554.21
....	....	....	....	....	....		to	55.1650	55.30	−38	54.92	....	....	....	....	....	....	54.92	+43	4555.4

132 *SCHJELLERUP—Continued*

Plate A 328						Plate G 309						Plate G 368						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Form.	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Form.	Cor. from Curve	Wave-Length	Uncor. for Velocity	Cor. for V	Cor. for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
1-2	n D?	43.6085	4555.12	− 5	4555.07													55.07	+43	4555.50
1	n D?	43.6902	4556.32	− 5	4556.27													56.27	+43	4556.70
																		56.91	+43	4557.34
3-4	nn B	43.8375	4558.50	− 5	4558.45	B												58.45	+43	4558.88
							to	54.9780	59.60	−37	59.23							59.23	+43	4559.7
													nn D	48.5330	59.69	+11	59.80	59.80	+43	4560.23
	nn D	44.0300	4561.36	− 4	4561.32													61.32	+43	4561.75
3	n B	44.0570	4561.76	− 4	4561.72	1	B	54.8642	62.28	−37	61.91							61.82	+43	4562.25
						2	n D	54.8214	63.27	−36	62.91	2	n D	48.3926	63.01	+12	63.13	63.02	+43	4563.45
							from	54.7910	64.00	−36	63.64							63.64	+43	4564.1
2	B	44.2195	4564.18	− 4	4564.14													64.14	+43	4564.57
	wn D	44.2850	4565.20	− 4	4565.16							1	n D	48.2775	65.75	+12	65.87	65.52	+43	4565.95
2	B	44.3557	4566.22	− 3	4566.19	B												66.19	+43	4566.62
2	n D?	44.3860	4566.67	− 3	4566.64													66.64	+43	4567.07
2-3	B	44.5449	4569.06	− 3	4569.03													69.03	+43	4569.46
							to	54.5230	70.20	−35	69.85							69.85	+43	4570.3
2	B	44.8269	4573.30	− 2	4573.28													73.28	+43	4573.71
1	n D	44.9627	4575.36	− 1	4575.35													75.35	+43	4575.78
						1	n D	54.2323	77.10	−34	76.76		w D	47.8480	76.10	+14	76.24	76.50	+43	4576.93
6	D	45.0835	4577.19	− 1	4577.18													77.18	+43	4577.61
4	B	45.1434	4578.10	− 1	4578.09		from	54.1810	78.30	−34	77.96							78.09	+43	4578.52
4	B	45.2195	4579.26	− 0	4579.26	Space												79.26	+43	4579.69
4	D	45.2700	4579.98	− 0	4579.98							1	n D	47.6864	79.77	+15	79.92	79.95	+43	4580.38
4	B	45.3184	4580.76	+ 1	4580.77													80.77	+43	4581.20
												1	n D	47.5916	82.27	+15	82.42	82.42	+43	4582.85
5	B	45.4965	4583.48	+ 1	4583.49													83.49	+43	4583.92
3	D	45.5517	4584.28	+ 1	4584.29													84.29	+43	4584.72
5	B	45.5989	4585.05	+ 2	4585.07													85.07	+43	4585.50
3	D	45.6497	4585.83	+ 2	4585.85													85.85	+43	4586.28
2	B	45.6892	4586.44	+ 2	4586.46													86.46	+43	4586.89
2	D	45.7242	4586.98	+ 2	4587.00													87.00	+43	4587.43
3-4	B	45.9165	4589.94	+ 2	4589.96	Unresolved B												89.96	+43	4590.39
4	n D	45.8625	4590.65	+ 2	4590.67													90.67	+43	4591.10
3	D	46.1562	4593.64	+ 3	4593.67													93.67	+43	4594.10
4	nn B	46.2895	4595.71	+ 4	4595.75							6	n B	47.0584	4595.36	+19	4595.55	95.65	+43	4596.08
1	n D	46.3422	4596.53	+ 4	4596.57								nn D	46.9901	4597.04	+19	4597.23	96.90	+43	4597.33
4	n B	46.5225	4599.34	+ 5	4599.39							3	B	46.9269	4598.62	+20	4598.82	99.11	+43	4599.54
4	D	46.5972	4600.52	+ 5	4600.57													00.57	+43	4601.00
4	B	46.6617	4601.52	+ 6	4601.58													01.58	+43	4602.01
							from	53.1590	46.0290	−29	4602.61							02.52	+43	4602.95
2	D	46.7216	4602.46	+ 6	4602.52													02.61	+43	4603.0
1	n D	46.9297	4605.73	+ 7	4605.80													05.80	+43	4606.23
						D							w D	46.6236	4606.19	+21	4606.40	06.40	+43	4606.83
4	n D	47.0101	4607.00	+ 7	4607.07													07.07	+43	4607.50
							to	52.9400	46.0830	−28	4608.02							08.02	+43	4608.5
	from	47.0530	4607.70	+ 7	4607.77													07.77	+43	4608.2
B																		09.52	+43	4609.95
	to	47.1575	4609.40	+ 7	4609.47													09.47	+43	4609.9
2	D	47.1800	4609.67	+ 7	4609.74													09.74	+43	4610.17
2	D	47.2515	4610.81	+ 8	4610.89													10.89	+43	4611.32
2	n B	47.2987	4611.56	+ 8	4611.64													11.64	+43	4612.07
												Max	B	46.3997	4611.83	+23	4612.06	12.06	+43	4612.49
2	n B	47.3585	4612.51	+ 8	4612.59													12.59	+43	4613.02
3-4	D	47.4129	4613.37	+ 9	4613.46								nn D	46.3442	4613.23	+23	4613.46	13.46	+43	4613.89
9	n B	47.4927	4614.64	+ 9	4614.73							4	B	46.2889	4614.65	+23	4614.88	14.80	+43	4615.23
5	D	47.5679	4615.84	+ 9	4615.93							2	D	46.2478	4615.68	+24	4615.92	15.93	+43	4616.36
1-2	B	47.6172	4616.63	+10	4616.73													16.73	+43	4617.16
6	B	47.6832	4617.68	+10	4617.78							8	B	46.1728	4617.58	+24	4617.82	17.80	+43	4618.23
2	n D	47.7640	4618.97	+10	4619.07							2	D	46.1195	4618.94	+24	4619.18	19.13	+43	4619.56
5-6	n B	47.8879	4620.98	+11	4621.09							2	B	46.0458	4620.82	+25	4621.07	21.08	+43	4621.51
4-5	B	48.0539	4623.63	+12	4623.75													23.75	+43	4624.18
1-2	B	48.1587	4625.32	+12	4625.44													25.44	+43	4625.87
2	B	48.2343	4626.54	+13	4626.67													26.67	+43	4627.10
1	n D	48.3307	4628.10	+13	4628.23													28.23	+43	4628.66
2	n D	48.4185	4629.52	+13	4629.65													29.65	+43	4630.08
2	n B	48.5152	4631.09	+14	4631.23							1	B	45.6568	4630.83	+28	4631.11	31.17	+43	4631.60
2	B?	48.6325	4633.00	+15	4633.15													33.15	+43	4633.58
1	D	48.6664	4633.56	+15	4633.71													33.71	+43	4634.14
	n D	48.8989	4637.35	+15	4637.50							1	n D	45.4289	4636.74	+29	4637.03	37.27	+43	4637.60
8	B	48.9635	4638.41	+16	4638.57							5	B	45.3652	4638.41	+30	4638.71	38.64	+43	4639.07
	from	48.9900	4638.90	+16	4639.06													39.06	+43	4639.5
D												4	D	45.3095	4639.86	+30	4640.16	40.16	+43	4640.59
	to	49.1120	4640.90	+17	4641.07													41.07	+43	4641.5
5-6	B	49.1394	4641.30	+17	4641.47													41.47	+43	4641.90
3	B	49.2263	4642.73	+17	4642.90													42.90	+43	4643.33
1	B?	49.2884	4643.75	+17	4643.92													43.92	+43	4644.35
													nn D	45.0712	4646.12	+31	4646.43	46.43	+43	4646.86
4	B	49.8122	4652.44	+20	4652.64													52.64	+44	4653.08
4	D	49.8697	4653.41	+21	4653.62													53.62	+44	4654.06
5	D	50.0139	4655.82	+21	4656.03													56.03	+44	4656.47
1	n D?	50.1154	4657.52	+23	4657.75													57.75	+44	4658.19
	n B	50.2485	4659.75	+23	4659.98													59.98	+44	4660.42
2	D?	50.2967	4660.57	+23	4660.80													60.80	+44	4661.24
2	D?	50.3763	4661.91	+23	4662.14													62.14	+44	4662.58
3	D	50.4763	4663.60	+24	4663.84	1	n D	50.7655	4663.82	−12	4663.70							63.77	+44	4664.21
3-4	B	50.5340	4664.58	+24	4664.82													64.82	+44	4665.26

132 *SCHJELLERUP — Continued*

Plate A 328						Plate G 309						Plate G 368						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Form.	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Form.	Cor. from Curve	Wave-Length	Uncor. for Velocity	Cor. for V	Cor. for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
3	D?	50.5832	4665.41	+24	4665.65													65.65	+44	4666.09
2–3	n D	50.6873	4667.19	+24	4667.43													67.43	+44	4667.87
2	n D	51.5407	4681.83	+28	4682.11													82.11	+44	4682.55
....	nn D	51.8997	4688.04	+30	4688.34													88.34	+44	4688.78
1	nn B?	51.9597	4689.09	+30	4689.39													89.39	+44	4689.83
....	D	52.5544	4699.53	+32	4699.85													99.85	+44	4700.29
1	B?	52.6080	4700.47	+32	4700.79													00.79	+44	4701.23
1	n D	52.6500	4701.22	+32	4701.54													01.54	+44	4701.98
1–2	nB?	52.6903	4701.93	+32	4702.25													02.25	+44	4702.69
1	n D	52.7540	4703.06	+32	4703.38													03.38	+44	4703.82
1	D	52.8505	4704.77	+32	4705.09													05.09	+44	4705.53
1	n B?	52.8925	4705.52	+32	4705.84													05.84	+44	4706.28
2–3	B	53.0750	4708.77	+33	4709.10	1	B	49.0644	47.0949	+ 3	4709.52							09.31	+44	4709.75
....												D	from	42.7230	4710.50	+49	4710.99	10.99	+44	4711.4
....	wn D	53.4100	4714.78	+33	4715.11													15.11	+44	4715.55
....													to	42.5570	4715.30	+50	4715.80	15.80	+44	4716.24
3	B	53.4762	4715.97	+34	4716.31													16.31	+44	4716.75
2	D?	53.5147	4716.66	+34	4717.00													17.00	+44	4717.44
2	B	53.5527	4717.35	+34	4717.69													17.69	+44	4718.13
....	D?	53.5919	4718.06	+34	4718.40													18.40	+44	4718.84
1	B	53.6160	4718.49	+34	4718.83													18.83	+44	4719.27
....	D?	53.6527	4719.15	+34	4719.49													19.49	+44	4719.93
	B	53.6892	4719.81	+34	4720.15													20.15	+44	4720.59
	wn D	53.8110	4722.02	+34	4722.36	2	n D	48.6381	47.2204	+ 6	47.2.10							22.23	+44	4722.67
Gen. Spec.	from	53 8460	4722.66	+34	4723.00													23.00	+44	4723.4
	to	54.0790	4726.90	+35	4727.25													27.25	+44	4727.7
....	w D	54.2185	4729.45	+36	4729.81													29.81	+44	4730.25
2	n B	54.2942	4730.83	+36	4731.19													31.19	+44	4731.63
1	n D	54.3422	4731.71	+36	4732.07													32.07	+44	4732.51
10	D	54.5738	4735.97	+36	4736.33	....	wn D	48.1631	4735.61	+ 9	4735.70	10	D	41.8619	4735.39	+55	4735.94	35.99	+44	4736.43
....							from	48.1010	4737.46	+ 9	4737.49		from	41.8190	4736.70	+55	4737.25	37.37	+44	4737.8
7	B	54.6845	4738.02	+37	4738.39		B	48.0691	4738.33	+ 9	4738.42		Max	41.7834	4737.70	+55	4738.25	38.35	+44	4738.79
....	n D	54.7390	4739.03	+37	4739.40	B						B						39.40	+44	4739.84
4-5	n B	54.8062	4740.27	+37	4740.64													40.64	+44	4741.08
....							to	47.9380	4742.10	+10	4742.20		to	41.6560	4741.50	+56	4742.06	42.13	+44	4742.6
10	D	54.9734	4743.38	+37	4743.75	....	w D	47.8895	4743.53	+10	4743.63	....	w D	41.6095	4742.83	+57	4743.40	43.56	+44	4744.00
	Head	55.0210	4744.26	+37	4744.63							....	Head	41.5589	4744.33	+57	4744.90	44.77	+44	4745.21
7	n B	55.0912	4745.57	+37	4745.94													45.94	+44	4746.38
....	n D?	55.1478	4746.62	+37	4746.99													46.88	+44	4747.32
6	n B	55.1952	4747.51	+37	4747.88													47.88	+44	4748.32
2–3	n D	55.2522	4748.58	+38	4748.96													48.96	+44	4749.40
4	n B	55.3075	4749.61	+38	4749.99													49.99	+44	4750.43
5	n B	55.5588	4754.33	+38	4754.71													54.71	+45	4755.16
....	n D	55.6065	4755.23	+38	4755.61													55.61	+45	4756.06
3	n B	55.6527	4756.10	+38	4756.48													56.48	+45	4756.93
3	n B	55.8185	4759.24	+38	4759.62													59.62	+45	4760.07
1	n D?	55.8737	4760.29	+39	4760.68													60.68	+45	4761.13
....	n B	55.9689	4762.09	+39	4762.48													62.48	+45	4762.93
....	nn D?	56.0145	4762.96	+39	4763.35													63.35	+45	4763.78
....	nn D	56.1545	4765.63	+39	4766.02													66.02	+45	4766.47
2	n B?	56.3755	4769.86	+39	4770.25													70.25	+45	4770.70
....	nn D?	56.4092	4770.50	+39	4770.89													70.89	+46	4771.34
....	nn D	56.4759	4771.79	+39	4772.18							1-2	nn D	40.6446	4771.83	+63	4772.46	72.32	+45	4772.77
....	n B	56.5880	4773.94	+39	4774.33													74.33	+45	4774.78
....	nn D	57.0985	4783.83	+40	4784.23	1	n D	46.5200	4784.29	+13	4784.42							84.33	+45	4784.78
2–3	D	57.3350	4788.46	+40	4788.86	1	n D	46.3532	4789.39	+13	4789.52	1	n D	40.1024	4788.63	+66	4789.29	89.22	+45	4789.67
													wn D	39.5773	4805.16	+69	4805.85	05.85	+45	4806.30
2–3	n D	58.6530	4814.66	+40	4815.06	1-2	n D	45.5132	4815.53	+10	4815.63	1-2	n D	39.2701	4815.08	+69	4815.77	15.48	+45	4815.93
....	nn D	59.0539	4822.88	+40	4823.28	1	n D	45.2591	4823.58	+ 9	4823.67	1	D	39.0250	4822.89	+69	4823.58	23.51	+45	4823.96
B	from	59.1050	4823.82	+40	4824.22							1-2						24.22	+45	4824.7
												2	B	38.9626	4824.91	+69	4825.60	25.60	+45	4826.05
	to	59.2190	4826.20	+40	4826.60													26.60	+45	4827.1
2	nn D	59.2528	4826.84	+40	4827.24	1	n D	45.1254	4827.86	+ 8	4827.94	1	D	38.8879	4827.36	+69	4828.05	27.74	+45	4828.19
4	B	59.3755	4829.35	+40	4829.75	....						2	B	38.8282	4829.29	+68	4829.97	29.86	+45	4830.31
3	D	59.4695	4831.29	+40	4831.69	3	n D	44.9958	4832.01	+ 8	4832.09	1	D	38.7728	4831.10	+68	4831.78	31.85	+45	4832.30
B	from	59.5120	4832.20	+40	4832.60													32.60	+45	4833.1
	to	59.7850	4837.80	+39	4838.19													38.19	+45	4838.6
1	n D	59.8160	4838.43	+39	4838.82							0-1	D	38.5475	4838.50	+68	4839.18	39.00	+45	4839.45
1	n D	60.0194	4842.66	+39	4843.05													43.05	+45	4843.50
5	n B?	60.3192	4848.92	+39	4849.31							2	B	38.2271	4849.12	+66	4849.78	49.55	+45	4850.00
1	n D	60.3977	4850.56	+38	4850.94													50.94	+46	4851.40
....	nn D	60.5772	4854.35	+38	4854.73													54.73	+46	4855.19
B	from	60.6150	4855.20	+38	4855.58													55.58	+46	4856.0
												Max	B	38.0023	4856.66	+65	4857.31	57.31	+46	4857.77
	to	60.7540	4858.10	+38	4858.48													58.48	+46	4858.9
1	n D	60.7717	4858.45	+38	4858.83													58.83	+46	4859.29
1	n D	61.1694	4866.91	+37	4867.28													67.28	+46	4867.74
3	n B	61.2407	4868.43	+37	4868.80													68.80	+46	4869.26
....	wn D	61.3192	4870.12	+37	4870.49	2	n D	43.8034	4871.20	+ 1	4871.21	1-2	n D	37.5917	4870.57	+63	4871.20	70.97	+46	4871.43
2–3	n D	61.5232	4874.50	+36	4874.86	2	n D	43.6862	4875.14	0	4875.14	1-2	D	37.4751	4874.56	+62	4875.18	75.06	+46	4875.52
5	wn B	61.7147	4878.64	+35	4878.99													78.99	+46	4879.45
5	D	61.7979	4880.44	+35	4880.79	2	n D	43.5099	4881.15	− 1	4881.14	2-3	D	37.2970	4880.69	+60	4881.29	81.07	+46	4881.53
1	nn D	62.2437	4890.16	+33	4890.49	2	n D	43.2250	4890.83	− 3	4890.80							90.65	+46	4891.11
....										1		Max	B	36.8043	4897.86	+58	4898.44	98.44	+46	4898.90
2	n D	62.6704	4899.56	+31	4899.87	1-2	n D	42.9421	4900.59	− 5	4900.54							00.21	+46	4900.67
1	nn D	63.0839	4908.76	+29	4909.05	1	nn D	42.6787	4909.76	− 7	4909.69							09.37	+46	4909.83

132 *SCHJELLERUP — Continued*

Plate A 328						Plate G 309						Plate G 368						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Form.	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Form.	Cor. from Curve	Wave-Length	Uncor. for Velocity	Cor. for V	Cor. for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
	from	63.5110	4918.35	+27	4918.62	....	......	....	....	....	....	....	....	....	....	....	....	18.62	+46	4919.1
D	......	....	....	....	....	4	wn D	42.3836	4920.15	− 9	4920.06	....	....	....	....	....	....	20.06	+46	4920.52
	to	63.6190	4920.80	+27	4921 07	....	......	....	....	....	....	....	....	....	....	....	....	21.07	+46	4921.5
1	nn D	63.7550	4923.87	+26	4924.13	1	n D	42.2439	4925.10	−10	4925.00	....	....	....	....	....	....	24.57	+46	4925.03
3	n D	64.1454	4932.78	+24	4933.02	2–3	n D	41.9972	4933.93	−11	4933.84	2	n D	35.8181	4933.19	+50	4933.69	33.55	+46	4934.01
		Strong continuous spectrum				2	n D	41.3424	4957.74	−16	4957.58	....	....	....	....	....	....	57.58	+47	4958.05
....	......	....	....	....	....	1	n D	40.7751	4979.61	−20	4979.41	....	....	....	....	....	....	79.41	+47	4979.88
....	wn D?	66.2155	4981.45	+10	4981.55	....	......	....	....	....	....	....	....	....	....	....	....	81.55	+47	4982.02
....	nn D?	66 5620	4989.90	+ 7	4989.97	....	......	....	....	....	....	....	....	....	....	....	....	89.97	+47	4990.44
2	n D?	66.9095	4998.33	+ 5	4998.38	1	n D	40.2257	4999.75	−23	4999.52	....	....	....	....	....	....	99.95	+47	5000.42
1	n D?	67.2257	5006.11	+ 3	5006.14	....	......	....	....	....	....	....	....	....	....	....	....	06.14	+47	5006.61
....	nn D?	67.3613	5009.47	+ 2	5009.49	....	......	....	....	....	....	....	....	....	....	....	....	09.49	+47	5009.96
....	nn D?	67.5384	5013.87	+ 0	5013.87	....	......	....	....	....	....	....	....	....	....	....	....	13.87	+47	5014.34
	End	68.4330	5036.40	− 6	5036.3		End	39.3502	5034.00	−30	5033.70		End	33.5380	5019.1	+30	5019.4	.....	....	....

132 *SCHJELLERUP*

Plate G 299 — 1899, March 5, G.M.T. 17h8. Hour angle, W 0h3. Star good; comparison fair						Plate G 301 — 1899, March 6, G.M.T. 19h0. Hour angle, W 1h5. Star excellent; comparison excellent						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
Head	....	46.5440	5167.70	+13	5167.83	Head	....	47.1560	5167.10	+17	5167.27	67.55	+49	5168.04
2	n D?	46.4342	5172.02	+11	5172.13	5	n D	47.0198	5172.46	+13	5172.59	72.36	+49	5172.85
	from	46.2150	5180.70	+ 8	5180.78	...	....	....	....	....	....	80.68	+49	5181.2
D	....	....	....	....	....	...	wn D	46.7500	5183.10	+ 7	5183.17	83.27	+49	5183.8
	to	46.1120	5184.70	+ 7	5184.77	...	....	....	....	....	....	84.67	+49	5185.2
...	....	....	....	....	....	B	from	46.7040	5184.90	+ 7	5184.97	84.87	+49	5185.4
1	n D	46.0144	5188.77	+ 7	5188.84	1	nn D	46.6120	5188.58	+ 6	5188.64	88.74	+49	5189.23
...	....	....	....	....	....		to	46.5470	5191.20	+ 6	5191.26	91.36	+49	5191.9
2	nn D	45.9239	5192.41	+ 6	5192.47	4	n D	46.5116	5192.57	+ 5	5192.62	92.55	+49	5193.04
...	....	....	....	....	....	B	from	46.4840	5193.68	+ 5	5193.73	93.83	+49	5194.3
D	from	45.6500	5203.50	+ 3	5203.53		to	46.2350	5203.68	0	5203.68	03.61	+49	5204.1
	to	45.4680	5211.00	+ 1	5211.01	D	to	46.0410	5211.54	− 3	5211.51	11.31	+49	5211.8
1	nn D	45.3440	5216.05	− 1	5216.04	1	nn D	45.9298	5216.06	− 5	5216.01	16.03	+49	5216.52
...	n D	45.0836	5226.83	− 4	5226.79	5	D	45.6663	5226.88	− 9	5226.79	26.79	+49	5227.28
2	n D	44.9239	5233.49	− 6	5233.43	4	n D	45.5059	5233.51	−11	5233.40	33.42	+49	5233.91
1	n B	44.8580	5236.30	− 7	5236.23	Max	B	45.4470	5235.95	−12	5235.83	36.03	+49	5236.52
...	....	....	....	....	....	1	n D	45.3657	5239.33	−13	5239.20	39.30	+49	5239.79
2-3	n D	44.5993	5247.16	−10	5247.06	3	n D	45.1846	5246.92	−15	5246.77	46.92	+49	5247.41
2–3	n D	44.5040	5251.20	−12	5251.08	3	D	45.0872	5251.01	−17	5250.84	50.96	+50	5251.46
...	....	....	....	....	....	1	nn D	44.9889	5255.17	−17	5255.00	55.10	+50	5255.60
4	n D	44.0566	5270.38	−19	5270.19	5	D	44.6447	5269.82	−20	5269.62	69.91	+50	5270.41
...	....	....	....	....	....	1–2	B	44.4300	5279.07	−21	5278.86	78.96	+50	5279.46
1	nn D	43.7500	5283.71	−21	5283.50	...	....	....	....	....	....	83.40	+50	5283.90
3	n D	43.4253	5297.99	−24	5297.75	3	D	44.0032	5297.67	−20	5297.47	97.61	+50	5298.11
1	n D	43.3304	5302.20	−25	5301.95	...	....	....	....	....	....	01.85	+50	5302.35
...	....	....	....	....	....	1	B	43.6564	5313.01	−18	5312.83	12.93	+50	5313.43
2	n D	43.0404	5315.16	−27	5314.89	1	n D	43.6151	5314.85	−18	5314.67	14.78	+50	5315.28
...	....	....	....	....	....	2	B	43.5594	5317.34	−18	5317.16	17.26	+50	5317.76
3	wn D	42.9105	5321.01	−28	5320.73	...	....	....	....	....	....	20.63	+50	5321.13
3-4	n D	42.7342	5329.00	−29	5328.71	4	n D	43.3099	5328.55	−15	5328.40	28.56	+50	5329.06
1	n D	42.5628	5336.81	−29	5336.52	1	nn D	43.1490	5335.84	−13	5335.71	36.32	+50	5336.82
2–3	n D	42.4548	5341.77	−30	5341.47	2	n D	43.0378	5340.90	−11	5340.79	41.13	+50	5341.63
...	....	....	....	....	....	1	B	42.7960	5352.00	− 8	5351.92	52.02	+50	5352.52
1	n D	41.9991	5362.90	−31	5362.59	...	....	....	....	....	....	62.49	+50	5362.99
2	n D	41.9202	5366.60	−31	5366.29	1	nn D	42.4895	5366.20	− 6	5366.14	66.22	+50	5366.72
2	B	41.8669	5369.10	−31	5368.79	2	B	42.4432	5368.36	− 5	5368.31	68.55	+50	5369.05
9	D	41.8114	5371.71	−31	5371.40	10	D	42.3777	5371.42	− 5	5371.37	71.39	+50	5371.89

132 *SCHJELLERUP—Continued*

Plate G 299						Plate G 301						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
3	n B	41.7405	5375.06	−31	5374.75	6	B	42.3104	5374.59	− 4	5374.55	74.65	+50	5375.15
1	n D	41.6927	5377.32	−31	5377.01	1	n D	42.2612	5376.90	− 4	5376.86	76.94	+50	5377.44
n	n B	41.6281	5380.38	−32	5380.06	...	....	....	....	....	....	79.96	+50	5380.46
1	n D	41.5478	5484.20	−32	5383.88	1	n D	42.1056	5384.25	− 3	5384.22	84.05	+50	5384.55
...	....	....	....	....	....	1	nn D	41.8301	5397.38	− 1	5397.37	97.47	+50	5397.97
...	....	....	....	....	....	1	nn D	41.6445	5406.30	0	5406.30	06.40	+50	5406.90
2	n D	41.0046	5410.35	−32	5410.03	2	D	41.5651	5410.14	0	5410.14	10.09	+50	5410.59
...	....	....	....	....	....	1–2	B	41.5310	5411.79	0	5411.79	11.89	+50	5412.39
1	nn D	40.9277	5414.10	−32	5413.78	1–2	n D	41.4980	5413.39	+ 1	5413.40	13.59	+50	5414.09
4	B	40.8673	5417.05	−32	5416.73	5	n B	41.4366	5416.38	+ 1	5416.39	16.56	+50	5417.06
6	wn D	40.7959	5420.55	−32	5420.23	2	D	41.3703	5419.61	+ 1	5419.62	19.93	+50	5420.43
...	....	....	....	....	....	3	n B	41.3123	5422.44	+ 1	5422.45	22.55	+50	5423.05
1	n D	40.7109	5424.73	−32	5424.42	2	n D	41.2679	5424.62	+ 2	5424.64	24.53	+59	5425.03
3	n D	40.5995	5430.23	−31	5429.92	4	D	41.1642	5429.72	+ 2	5429.74	29.83	+50	5430.33
...	....	....	....	....	....	3	B	41.1254	5431.63	+ 2	5431.65	31.75	+50	5432.25
1	nn D	40.5200	5434.17	−31	5433.86	2	n D	41.0808	5433.82	+ 2	5433.84	33.85	+50	5434.35
7	D	40.2479	5447.74	−30	5447.44	9	D	40.8159	5446.99	+ 3	5447.02	47.23	+50	5447.73
Max	B	40.1815	5451.08	−30	5450.78	Max	B	40.7560	5449.98	+ 3	5450.01	50.40	+51	5450.91
3	n D	40.0686	5456.77	−30	5456.47	2 3	D	40.6298	5456.32	+ 3	5456.35	56.41	+51	5456.92
1	n D	39.9823	5461.14	−29	5460.85	2	n D	40.5554	5460.07	+ 4	5460.11	60.48	+51	5460.99
1	n D	39.8744	5466.63	−29	5466.34	...	....	....	....	....	....	66.24	+51	5466.75
3	n B	39.7607	5472.43	−28	5472.15	3	B	40.3283	5471.59	+ 4	5471.63	71.89	+51	5472.40
...	....	....	....	....	....	1	n D	40.2899	5473.55	+ 4	5473.59	73.69	+51	5474.20
...	....	....	....	....	....	1–2	n D	40.2149	5477.39	+ 4	5477.43	77.53	+51	5478.04
1	n D	39.5595	5482.77	−28	5482.49	1	n D	40.1169	5482.42	+ 4	5482.46	82.48	+51	5482.99
1	B	39.3182	5495.29	−26	5495.03	2	B	39.8698	5495.19	+ 5	5495.24	95.14	+51	5495.65
5	D	39.2723	5497.68	−26	5497.42	5	D	39.8283	5497.35	+ 5	5497.40	97.41	+51	5497.92
...	....	....	....	....	....	4	n D	39.7458	5501.65	+ 5	5501.70	01.80	+51	5502.31
...	....	....	....	....	....	1	n D	39.6583	5506.23	+ 5	5506.28	06.38	+51	5506.89
...	....	....	....	....	....	2	wn B	39.6205	5508.22	+ 5	5508.27	08.37	+51	5508.88
1-2	n D	38.9961	5512.19	−24	5511.95	2-3	nn D	39.5505	5511.90	+ 5	5511.95	11.95	+51	5512.46
Con.	from	38.9720	5513.50	−24	5513.26	Con.	from	39.5240	5513.30	+ 5	5513.35	13.31	+51	5513.82
Spec.	to	38.7880	5523.20	−23	5522.97	Spec.	to	39.3530	5522.36	+ 4	5522.40	22.69	+51	5523.2
1	n D	38.7687	5524.26	−23	5524.03	...	nn D	39.3288	5523.63	+ 4	5523.67	23.85	+51	5524.36
1	nn D	38.7000	5527.90	−22	5527.68	...	....	....	....	....	....	27.58	+51	5528.09
1	n D	38.5912	5533.76	−21	5533.55	1	n D	39.1515	5533.10	+ 4	5533.14	33.35	+51	5533.86
9	D	38.4818	5539.65	−20	5539.45	7	D	39.0395	5539.11	+ 4	5539.15	39.30	+51	5539.81
...	....	....	....	....	....		from	39.0080	5544.00	+ 4	5544.04	44.14	+51	5544.7
2–3	n B	38.4125	5543.40	−20	5543.20	B	....	....	....	....	....	43.10	+51	5543.61
...	....	....	....	....	....		to	38.9110	5546.10	+ 4	5546.14	46.24	+51	5546.8
1	n D	38.3335	5547.68	−19	5547.49	1–2	D	38.8841	5547.51	+ 4	5547.55	47.52	+51	5548.03
1	n D	38.1797	5556.06	−18	5555.88	...	....	....	....	....	....	55.78	+51	5556.30
...	....	....	....	....	....	1	nn D	38.6247	5561.55	+ 3	5561.58	61.68	+52	5562.20
1	n B	38.0298	5564.29	−16	5564.13	1–2	n B	38.5843	5563.87	+ 3	5563.90	64.02	+52	5564.54
1	n D	37.9876	5566.61	−16	5566.45	1	nn D	38.5429	5566.15	+ 3	5566.18	66.32	+52	5566.84
1	n B	37.9020	5571.34	−15	5571.19	2	B	38.4535	5571.07	+ 2	5571.09	71.14	+52	5571.66
...	....	....	....	....	....	1	nn D	38.4240	5572.71	+ 2	5572.73	72.83	+52	5573.4
...	....	....	....	....	....	1	n D	38.3669	5575.86	+ 2	5575.88	75.98	+52	5576.50
9	D	37.6804	5583.65	−13	5583.52	9	D	38.2360	5583.14	+ 1	5583.15	83.34	+52	5583.86
2	B	37.6268	5586.65	−12	5586.53	4	B	38.1785	5586.35	+ 1	5586.36	86.45	+52	5586.97
1	nn D	37.5900	5588.70	−12	5588.58	1	n D	38.1459	5588.17	+ 1	5588.18	88.38	+52	5588.90
1	nn B	37.5402	5591.51	−11	5591.40	...	....	....	....	....	....	91.30	+52	5591.82
1	nn D	37.5002	5593.76	−11	5593.65	1	n D	38.0398	5594.13	0	5594.13	93.89	+52	5594.41
2	nn B	37.4529	5596.42	−10	5596.32	2–3	n B	37.9992	5596.41	0	5596.41	96.37	+52	5596.89
1–2	nn D	37.3884	5600.07	− 9	5599.98	1	n D	37.9477	5599.31	0	5599.31	99.65	+52	5600.17
1	nn D	37.2338	5608.84	− 7	5608.77	2	n D	37.7891	5608.30	− 1	5608.29	08.53	+52	5609.05
Con.	from	37.2150	5609.90	− 7	5609.83	...	....	....	....	....	....	09.73	+52	5610.3
...	....	....	....	....	....	1	n D	37.6748	5614.82	− 2	5614.80	14.90	+52	5615.42
...	....	....	....	....	....	1–2	n B	37.6452	5616.51	− 2	5616.49	16.59	+51	5617.11
Spec.	to	37.0760	5617.84	− 5	5617.79	...	....	....	....	....	....	17.69	+52	5618.2
...	D	37.0440	5619.68	− 5	5619.63	3	n D	37.5958	5619.35	− 2	5619.33	19.48	+52	5620.00
...	D	36.9600	5624.51	− 3	5624.48	4	D	37.5195	5623.73	− 3	5623.70	24.09	+52	5624.61
Con.	from	36.9290	5626.30	− 3	5626.27	Con.	from	37.4820	5625.90	− 3	5625.87	26.07	+52	5626.6
Spec.	to	36.8510	5630.80	− 2	5630.78	Spec.	to	37.3930	5631.10	− 3	5631.07	30.93	+52	5631.5
10	D	36.8072	5633.35	− 1	5633.34	10	D	36.3548	5633.24	− 4	5633.20	33.27	+52	5633.79

132 *SCHJELLERUP—Continued*

PLATE G 299						PLATE G 301						MEAN WAVE-LENGTH		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
	Head	36.7553	5636.36	− 1	5636.35	...	Head	37.3100	5635.84	− 4	5635.80	36.08	+52	5636.60
1-2	n B	36.7356	5637.54	0	5637.54	3-4	n B	37.2867	5637.19	− 4	5637.15	37.35	+52	5637.87
1	n D	36.7105	5638.97	0	5638.97	...	....	....	....	....	....	38.87	+52	5639.39
1-2	n B	36.6836	5640.54	+ 1	5640.55	3-4	n B	37.2398	5639.93	− 4	5639.89	40.22	+52	5640.74
...	wn D	36.6307	5643.63	+ 2	5643.65	...	nn D	37.1849	5643.13	− 5	5643.08	43.37	+52	5643.89
...	....	....	....	....	....	1-2	n B	37.1431	5645.58	− 5	5645.53	45.63	+52	5646.15
...	....	....	....	....	....	1	n B	36.9852	5654.85	− 6	5654.79	54.89	+53	5655.42
...	....	....	....	....	....	1	n D	36.9428	5657.36	− 6	5657.30	57.40	+53	5657.93
1	n D	36.1689	5670.90	+10	5671.00	1	nn D	36.7302	5669.97	− 6	5669.91	70.46	+53	5670.99
1	n D	36.0795	5676.24	+12	5676.36	1	nn D	36.6357	5675.61	− 7	5675.54	75.95	+53	5676.48
1	nn D	35.9256	5685.49	+15	5685.64	1	nn D	36.4636	5685.96	− 8	5685.88	85.76	+53	5686.29
4	n B	35.8105	5692.45	+17	5692.62	4	B	36.3503	5692.82	− 9	5692.73	92.68	+53	5693.21
...	....	....	....	....	....	1	nn D	36.2948	5696.19	−10	5696.09	96.19	+53	5696.72
2	n B	35.6228	5703.87	+21	5704.08	4	B	36.1661	5704.04	−11	5703.93	04.00	+53	5704.53
1-2	n D	35.5629	5707.54	+22	5707.76	2	n D	36.1056	5707.75	−11	5707.64	07.70	+53	5708.23
...	....	....	....	....	....	1	B	36.0658	5710.19	−11	5710.08	10.18	+53	5710.71
1	nn D	35.4974	5711.56	+23	5711.79	2	n D	36.0375	5711.94	−12	5711.82	11.80	+53	5712.33
	from	35.4660	5713.50	+20	5713.70	...	....	....	....	....	....	13.60	+53	5714.1
B	....	....	....	....	....	5	nn B	35.9747	5715.80	−12	5715.68	15.78	+53	5716.31
	to	35.3790	5718.90	+30	5719.20	...	....	....	....	....	....	19.10	+53	5719.6
1	n D	35.3473	5720.82	+30	5721.12	...	....	....	....	....	....	21.02	+53	5721.6
2-3	B	35.3117	5723.02	+30	5723.32	4	nn B	35.8461	5723.76	−13	5723.62	23.47	+53	5724.00
3-4	n D	35.1870	5730.80	+30	5731.10	2	D	35.7394	5730.41	−14	5730.27	30.19	+53	5730.72
B	from	35.1570	5732.70	+40	5733.10	B	from	35.7150	5732.00	−14	5731.86	32.5	+53	5733.0
	to	35.0290	5740.60	+40	5741.00		to	35.5750	5740.80	−15	5740.65	40.83	+53	5741.4
1	nn D	34.9955	5742.77	+40	5743.17	...	....	....	....	....	....	43.07	+53	5743.60
1	nn D	34.9234	5749.30	+40	5749.70	2	n D	35.4554	5748.25	−16	5748.09	48.90	+53	5749.43
...	....	....	....	....	....	2	n D	35.2506	5761.26	−18	5761.08	61.18	+54	5761.72
...	....	....	....	....	....	1-2	B	35.1708	5766.37	−19	5766.18	66.28	+54	5766.82
2	n D	34.5817	5769.03	+40	5769.43	...	w D	35.1245	5769.34	−19	5769.15	69.25	+54	5769.79
	from	34.5550	5770.70	+40	5771.10	...	....	....	....	....	....	71.00	+54	5771.5
B	....	....	....	....	....	1-2	B	35.0553	5773.79	−20	5773.59	73.69	+54	5774.23
	....	....	....	....	....	1-2	B	34.9712	5779.22	−21	5779.01	79.11	+54	5779.65
	to	34.4090	5780.10	+40	5780.50	...	....	....	....	....	....	80.40	+54	5780.9
...	....	....	....	....	....		from	34.9520	5780.50	−21	5780.29	80.39	+54	5780.9
...	D	34.3690	5782.70	+40	5783.10	D	....	....	....	....	....	83.00	+54	5783.5
...	....	....	....	....	....		to	34.8620	5786.30	−22	5786.08	86.18	+54	5786.7
...	....	....	....	....	....	1	nn D	34.8260	5788.70	−22	5788.48	88.58	+54	5789.1
...	....	....	....	....	....	1	nn D	34.7620	5792.90	−23	5792.67	92.77	+54	5793.3
1	nn D	34.1639	5796.06	+1. ±	5797.	1	n D	34.6951	5797.20	−24	5796.96	97.06	+54	5797.60
...	....	....	....	....	....	1	n D	34.6066	5803.00	−25	5802.75	02.85	+54	5803.39
1	D	34.0431	5803.96	+1. ±	5805.	...	....	....	....	....	....	05.	+54	5806.
...	....	....	....	....	....	2	n D	34.3239	5821.74	−27	5821.47	21.57	+54	5822.11
...	....	....	....	....	....	1	n D	34.2052	5829.68	−29	5829.39	29.49	+54	5830.03
...	....	....	....	....	....	Max	B	34.0230	5842.00	−30	5841.70	41.80	+54	5842.34
·	End	32.9740	5876.0	+1. ±	5876.	·	End	33.3700	5886.90	−30	5886.60	.....	....	....

115 *SCHJELLERUP*

PLATE G 363 1899, December 26, G.M.T. 21^h0. Hour angle, W 1^h0 Star poor; comparison fair						PLATE G 382 1900, January 31, G.M.T. 19^h3. Hour angle, W 1^h7 Star fair; comparison fair						MEAN WAVE-LENGTH		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
...	....	....	....	....	....	...	nn D	55.3980	4404.82	−11	4404.71	04.73	+19	4404.92
...	....	....	....	....	....	1	n D	55.3004	4407.81	−12	4407.69	07.71	+19	4407.90
...	....	....	....	....	....	1	n D	55.0060	4416.87	−15	4416.72	16.74	+19	4416.93
...	....	....	....	....	....	4-5	wn D	54.4137	4435.46	−20	4435.26	35.28	+19	4435.47

115 *SCHJELLERUP — Continued*

PLATE G 363						PLATE G 382						MEAN WAVE-LENGTH		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
...	....	....	....	....	....	3	n B	54.3122	4438.70	−20	4438.50	38.52	+19	4438.71
...	....	....	....	....	....	2–3	wn D	53.9600	4450.04	−23	4449.81	49.83	+19	4450.02
...	....	....	....	....	....	...	n D	53.5890	4462.18	−24	4461.94	61.96	+20	4462.2
...	....	....	....	....	....	1	D	53.3279	4470.87	−24	4470.63	70.65	+20	4470.85
...	....	....	....	....	....	2	n B	53.2443	4473.67	−24	4473.43	73.45	+20	4473.65
1	n B	50.5985	4478.12	+28	4478.40	...	....	....	....	....	....	78.38	+20	4478.58
...	....	....	....	....	....	2	n B	52.9343	4484.15	−24	4483.91	83.93	+20	4484.13
...	....	....	....	....	....	2	n D	52.9075	4485.07	−24	4484.83	84.85	+20	4485.05
...	....	....	....	....	....	2	n B	52.8835	4485.89	−24	4485.65	85.67	+20	4485.87
1	n D	50.0670	4496.57	+25	4496.82	1–2	n D	52.5580	4497.09	−23	4496.86	96.84	+20	4497.04
1	nn D	49.9557	4500.49	+24	4500.73	...	....	....	....	....	....	00.71	+20	4500.91
...	....	....	....	....	....	1	n B	52.3616	4503.92	−23	4503.69	03.71	+20	4503.91
1–2	n D	49.7954	4506.18	+24	4506.42	2	n D	52.2772	4506.89	−23	4506.66	06.54	+20	4506.74
...	....	....	....	....	....	3	n B	52.2392	4508.22	−23	4507.99	08.01	+20	4508.21
...	....	....	....	....	....	1–2	nn D	52.1026	4513.05	−22	4512.83	12.85	+20	4513.05
...	....	....	....	....	....	1–2	n D	51.9575	4518.20	−21	4517.99	18.01	+20	4518.21
...	nn D	49.3424	4522.48	+22	4522.70	2–3	n D	51.8164	4523.25	−20	4523.05	22.88	+20	4523.08
...	....	....	....	....	....	3	n B	51.7799	4524.57	−20	4524.37	24.39	+20	4524.59
...	....	....	....	....	....	...	n D	51.6999	4527.45	−19	4527.26	27.28	+20	4527.48
...	nn D	48.9980	4535.11	+21	4535.32	...	n D	51.4760	4535.58	−18	4535.40	35.36	+20	4535.56
...	n B	48.9534	4536.76	+21	4536.97	...	n B	51.4330	4537.16	−17	4536.99	36.98	+20	4537.08
...	....	....	....	....	....	1	B	51.3933	4538.61	−17	4538.44	38.46	+20	4538.66
...	....	....	....	....	....	1	B	51.1457	4547.74	−15	4547.59	47.61	+20	4547.81
...	wn D	48.5380	4552.31	+20	4552.51	...	....	....	....	....	....	52.49	+20	4552.69
...	....	....	....	....	....	4	n D	50.9777	4554.00	−13	4553.87	53.89	+20	4554.09
...	nn D	48.3365	4559.97	+20	4560.17	...	....	....	....	....	....	60.15	+20	4560.35
B {	from	48.1690	4566.39	+20	4566.59	...	....	....	....	....	....	66.57	+20	4566.8
	to	48.1020	4568.97	+20	4569.17	...	....	....	....	....	....	69.15	+20	4569.4
0–1	B	47.9985	4572.98	+20	4573.18	...	....	....	....	....	....	73.16	+20	4573.36
D {	from	47.9890	4573.35	+20	4573.55	...	....	....	....	....	....	73.53	+20	4573.7
	to	47.9000	4576.81	+20	4577.01	...	....	....	....	....	....	76.99	+20	4577.2
...	....	....	....	....	....	...	nn D	50.0410	4589.87	+ 4	4589.91	89.93	+20	4590.13
1	n D	47.5459	4590.75	+21	4590.96	...	....	....	....	....	....	90.94	+20	4591.14
...	nn D	47.4864	4593.12	+21	4593.33	...	....	....	....	....	....	93.31	+20	4593.51
0–1	n D	47.4005	4596.55	+21	4596.76	...	....	....	....	....	....	.....	....	....
...	....	....	....	....	....	...	nn D	49.8490	4597.44	+ 8	4597.52	97.14	+20	4597.34
...	....	....	....	....	....	1	nn D	49.7752	4600.37	+ 9	4600.46	00.48	+20	4600.68
...	....	....	....	....	....	D {	from	49.6580	4605.04	+12	4605.16	05.18	+20	4605.4
2–3	n D	47.1697	4605.84	+22	4606.06		....	....	....	....	....	06.04	+20	4606.24
...	....	....	....	....	....		to	49.5790	4608.20	+12	4608.32	08.34	+20	4608.5
1–2	n D	47.0049	4612.53	+22	4612.75	...	....	....	....	....	....	12.71	+20	4612.91
...	....	....	....	....	....	3	n B	49.3524	4617.36	+16	4617.52	17.54	+20	4617.74
1	n D	46.8450	4619.08	+22	4619.30	2	n D	49.3124	4618.98	+16	4619.14	19.22	+20	4619.42
...	....	....	....	....	....	2	n D	49.2172	4622.87	+17	4623.04	23.06	+20	4623.26
...	....	....	....	....	....	1–2	n B	48.8429	4638.32	+24	4638.56	38.58	+20	4638.78
...	....	....	....	....	....	1–2	nn D	48.8047	4639.91	+24	4640.15	40.17	+20	4640.37
...	nn D	45.7074	4667.27	+28	4667.55	...	....	....	....	....	....	67.53	+20	4667.73
...	....	....	....	....	....	1–2	n D	47.9970	4674.37	+33	4674.70	74.72	+20	4674.92
1	n D	45.0400	4696.91	+34	4697.25	...	....	....	....	....	....	97.21	+20	4697.41
...	....	....	....	....	....	0–1	D	46.9420	4721.68	+39	4722.07	22.09	+20	4722.29
...	....	....	....	....	....	1	D	46.7818	4729.10	+39	4729.49	29.51	+20	4729.71
...	nn D	44.2260	4734.51	+40	4734.91	...	....	....	....	....	....	34.89	+20	4735.09
3	n B	44.1447	4738.36	+41	4738.77	4	B	46.5858	4738.27	+39	4738.66	38.72	+20	4738.92
1	n D	44.1187	4739.60	+41	4740.01	...	....	....	....	....	....	39.99	+20	4740.19
10	D	44.0418	4743.26	+42	4743.68	10	w D	46.4882	4742.87	+39	4743.26	43.47	+20	4743.67
Head	....	44.0112	4744.72	+42	4745.14	Head	....	46.4447	4744.93	+39	4745.32	45.23	+20	4745.43
B {	....	....	....	....	....	4–5	B	46.4204	4746.09	+39	4746.48	46.50	+20	4746.70
	to	43.9450	4747.88	+42	4748.30	...	....	....	....	....	....	48.28	+20	4748.5
...	nn D	43.9240	4748.89	+42	4749.31	...	....	....	....	....	....	49.29	+20	4749.49
...	nn D	43.8658	4751.69	+42	4752.01	...	....	....	....	....	....	51.99	+21	4752.20
...	nn B	43.8075	4754.50	+42	4754.92	...	....	....	....	....	....	54.90	+21	4755.11
...	....	....	....	....	....	...	nn B	46.2173	4755.78	+39	4756.17	56.19	+21	4756.40
...	nn D	43.7227	4758.61	+43	4759.04	...	wn D	46.1725	4757.94	+39	4758.33	58.69	+21	4758.90
...	nn D	43.5640	4766.35	+44	4766.79	...	....	....	....	....	....	66.77	+21	4766.98

115 *SCHJELLERUP — Continued*

Plate G 363						Plate G 382						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
...	nn D	43.4590	4771.50	+44	4771.94	2	n D	45.8917	4771.56	+37	4771.93	71.94	+21	4772.15
	from	43.4380	4772.54	+44	4772.98	...	....	....	....	....	....	72.96	+21	4773.2
B	....	....	....	....	....	...	nn B	45.8163	4775.25	+37	4775.62	75.64	+21	4775.85
	to	43.3330	4777.73	+44	4778.17	...	....	....	....	....	....	78.15	+21	4778.4
...	nn D	43.2117	4783.77	+44	4784.21	...	nn D	45.6463	4783.64	+36	4784.00	84.11	+21	4784.32
...	nn D	43.1119	4788.77	+44	4789.21	1	n D	45.5444	4788.71	+35	4789.06	89.14	+21	4789.35
	from	43.0870	4790.01	+44	4790.45		from	45.5250	4789.66	+35	4790.01	90.23	+21	4790.4
B	....	....	....	....	....	B	Max	45.4380	4794.03	+34	4794.37	94.39	+21	4794.60
	to	42.9740	4795.71	+44	4796.15		to	45.4090	4795.48	+34	4795.82	95.99	+21	4796.2
...	wn D	42.7862	4805.27	+44	4805.71	...	wn D	45.2170	4805.19	+32	4805.51	05.61	+21	4805.82
2	n B	42.7027	4809.56	+45	4810.01	...	....	....	....	....	....	09.99	+21	4810.20
...	....	....	....	....	....	1	n D	45.0995	4811.18	+31	4811.49	11.51	+21	4811.72
2	n B	42.6404	4813.28	+45	4813.73	...	....	....	....	....	....	13.71	+21	4813.92
2-3	n D	42.5982	4814.94	+45	4815.39	1-2	n D	45.0229	4815.11	+30	4815.41	15.40	+21	4815.61
B	from	42.5740	4816.19	+45	4816.64	B	from	45.0000	4816.27	+29	4816.56	16.60	+21	4816.8
	to	42.4740	4821.38	+44	4821.82		to	44.8960	4821.64	+28	4821.92	21.87	+21	4822.1
...	....	....	....	....	....	1	n D	44.8744	4822.76	+28	4823.04	23.06	+21	4823.27
...	....	....	....	....	....	2	n B	44.8280	4825.18	+28	4825.46	25.48	+21	4825.69
1	nn D	42.3615	4827.26	+44	4827.70	2	n D	44.7862	4827.35	+27	4827.62	27.67	+21	4827.88
...	....	....	....	....	....	2-3	n B	44.7425	4829.63	+26	4829.89	29.91	+21	4830.12
1-2	nn D	42.2722	4831.96	+44	4832.40	1	n D	44.6994	4831.88	+25	4832.13	32.27	+21	4832.48
...	nn D	41.9100	4851.24	+44	4851.68	...	....	....	....	....	....	51.66	+21	4851.87
	from	41.8320	4854.90	+44	4855.34		from	44.2640	4854.96	+19	4855.15	55.25	+21	4855.5
B	....	....	....	....	....	B	Max	44.1507	4861.07	+16	4861.23	61.25	+21	4861.46
	to	41.6410	4865.81	+43	4866.24		to	44.0830	4864.73	+15	4864.88	65.6	+21	4865.8
1	n D	41.6222	4866.85	+43	4867.28	1-2	n D	44.0414	4867.01	+15	4867.16	67.22	+21	4867.43
0-1	nn D	41.3720	4880.63	+42	4881.15	1	n D	43.7907	4880.75	+11	4880.86	80.88	+21	4881.09
...	....	....	....	....	....	1-2	n D	43.6319	4889.56	+ 9	4889.65	89.67	+21	4889.88
B	from	41.1520	4892.92	+41	4893.33	B	from	43.5760	4892.67	+ 8	4892.75	93.03	+21	4893.2
	to	41.0190	4900.44	+41	4900.85		to	43.4160	4901.66	+ 7	4901.73	01.27	+21	4901.5
2	D	41.0042	4901.28	+40	4901.68	...	....	....	....	....	....	01.66	+21	4901.87
1-2	n B	40.9810	4902.59	+40	4902.99	...	....	....	....	....	....	02.97	+21	4903.18
1	nn D	40.8482	4910.17	+40	4910.57	2	n D	43.2725	4909.82	+ 6	4909.88	10.28	+21	4910.49
1	nn D	40.6661	4920.66	+38	4921.04	...	....	....	....	....	....	21.02	+21	4921.23
1	n D	40.6026	4924.34	+38	4924.72	...	....	....	....	....	....	24.70	+21	4924.91
...	....	....	....	....	....	...	wn D	42.0619	4981.44	− 3	4981.41	81.43	+22	4981.65

115 *SCHJELLERUP*

Plate G 365 1899, December 27, G.M.T. 21h8. Hour angle, W 1h8 Star good; comparison fair						Plate G 374 1900, January 7, G.M.T. 20h5. Hour angle, W 2h3 Star good; comparison good						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
2	n D	45.7520	5166.77	+22	5166.99	...	....	....	....	....	....	67.01	+23	5167.24
	from	45.7270	5167.78	+22	5168.00	...	....	....	....	....	....	68.02	+23	5168.3
B	....	....	....	....	....	...	nn B	46.5144	5170.54	+20	5170.74	70.73	+23	5170.96
	to	45.6140	5172.35	+21	5172.56	...	....	....	....	....	....	72.58	+23	5172.8
4	n D	45.5914	5173.29	+21	5173.50	...	nn D	46.4433	5173.42	+19	5173.61	73.56	+23	5173.79
B	from	45.5610	5174.50	+21	5174.71	...	....	....	....	....	....	74.73	+23	5175.0
	to	45.3600	5182.69	+19	5182.88	...	....	....	....	....	....	82.90	+23	5183.2
2-3	n D	45.3395	5183.55	+19	5183.74	...	nn D	46.2114	5182.84	+17	5183.01	83.38	+23	5183.61
B	from	45.3130	5184.61	+19	5184.80	...	....	....	....	....	....	84.82	+23	5185.1
	to	45.2240	5188.27	+18	5188.45	...	....	....	....	....	....	88.47	+23	5188.8
1	n D	45.2068	5189.00	+18	5189.18	...	....	....	....	....	....	89.20	+23	5189.43

115 *SCHJELLERUP—Continued*

PLATE G 365						PLATE G 374						MEAN WAVE-LENGTH		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
2	n B	45.1734	5190.37	+18	5190.55	...	....	....	....	....	....	90.57	+23	5190.80
...	wn D	45.1025	5193.30	+18	5193.48	...	nn D	45.9565	5193.30	+14	5193.44	93.46	+23	5193.69
B	from	45.0520	5195.36	+17	5195.53	...	....	....	....	....	....	95.55	+23	5195.8
	to	44.8320	5204.51	+16	5204.67	...	....	....	....	....	....	04.69	+23	5204.9
D	....	....	....	....	....	...	nn D	45.5330	5210.91	+10	5211.01	11.00	+23	5211.23
	to	44.6390	5212.60	+15	5212.75	...	....	....	....	....	....	12.77	+23	5213.0
4	n B	44.6065	5213.99	+15	5214.14	3	n B	45.4592	5214.00	+10	5214.10	14.12	+23	5214.35
...	nn D	44.5520	5216.26	+14	5216.40	...	nn D	45.4030	5216.37	+10	5216.47	16.44	+23	5216.67
B	from	44.5200	5217.62	+14	5217.76	...	....	....	....	....	....	17.78	+23	5218.0
	to	44.3550	5224.61	+14	5224.75	...	....	....	....	....	....	24.77	+23	5225.0
8	nn D	44.3124	5226.44	+14	5226.58	2	n D	45.1650	5226.44	+ 8	5226.52	26.55	+23	5226 78
B	from	44.2700	5228.23	+14	5228.37	...	....	....	....	....	....	28.39	+23	5228.6
	....	....	....	....	....	...	nn B	45.0709	5230.44	+ 7	5230.51	30.50	+23	5230.73
	to	44.1760	5232.25	+14	5232.39	...	....	....	....	....	....	32.41	+23	5232.6
3	nn D	44.1515	5233.33	+14	5233.47	2-3	n D	44.9883	5233.97	+ 7	5234.04	33.76	+23	5233.99
6	wn B	44.0825	5236.29	+14	5236.43	...	n B	44.9305	5236.45	+ 6	5236.51	36.47	+23	5236.70
...	....	....	....	....	....	...	nn D	44.8554	5239.68	+ 6	5239.74	39.73	+23	5239.96
3	wn B	43.8963	5244.32	+13	5244.45	...	....	....	....	....	....	44.47	+23	5244.70
3	nn D	43.8389	5246.81	+13	5246.94	...	....	....	....	....	....	46.96	+23	5247.19
...	nn D	43.7377	5251.22	+13	5251.35	...	nn D	44.5752	5251.80	+ 5	5251.85	51.60	+23	5251.83
5	n D	43.3054	5270.22	+13	5270.35	...	nn D	44.1457	5270.64	+ 4	5270.68	70.52	+23	5270.75
...	nn B	43.0890	5279.87	+14	5280.01	...	nn B	43.9420	5279.69	+ 4	5279.73	79.87	+23	5280.10
2–3	D	42.6942	5297.67	+16	5297.83	2	n D	43.5260	5298.39	+ 5	5298.44	98.14	+23	5298.37
...	nn B	42.5400	5304.71	+17	5304.88	...	nn B	43.3840	5304.85	+ 6	5304.91	04.90	+23	5305.13
4	n B	42.3692	5312.55	+18	5312.73	3	n B	43.2060	5313.00	+ 6	5313.06	12.90	+23	5313.13
2–3	nn D	42.3214	5314.75	+19	5314.94	3	n D	43.1597	5315.13	+ 6	5315.19	15.07	+23	5315.30
9	n B	42.2672	5317.26	+19	5317.45	7	B	43.1052	5317.64	+ 7	5317.71	17.58	+23	5317.81
1	nn D	42.2055	5320.10	+20	5320.30	3	nn D	43.0415	5320.58	+ 7	5320.65	20.48	+23	5320.71
...	nn D	41.8519	5336.64	+24	5336.88	4	n D	42.6999	5336.49	+10	5336.59	36.74	+23	5336.97
5	n B	41.8054	5338.82	+25	5339.07	6	n B	42.6474	5338.95	+10	5339.05	39.06	+23	5339.29
...	n D?	41.7544	5341.23	+27	5341.50	3	n D	42.5935	5341.49	+11	5341.60	41.55	+23	5341.78
...	nn B	41.6914	5344.21	+28	5344.49	...	nn B	42.5327	5344.35	+11	5344.46	44.48	+23	5344.71
4	n B	41.5324	5351.77	+30	5352.07	1–2	n B	42.3685	5352.13	+12	5352.25	52.16	+23	5352.39
...	....	....	....	....	....	B	from	42.3060	5355.11	+13	5355.24	55.22	+23	5355.5
...	....	....	....	....	....		to	42.1100	5364.49	+15	5364.64	64.62	+23	5364.9
...	....	....	....	....	....	1–2	n D	42.0863	5365.62	+15	5365.77	65.76	+23	5365.99
1	n D	41.2200	5366.77	+36	5367.13	...	....	....	....	....	....	67.15	+23	5367.38
3	n B	41.1918	5368.14	+36	5368.50	2	n B	42.0308	5368.29	+16	5368.45	68,48	+23	5368.71
...	....	....	....	....	....	D	from	42.0000	5369.78	+16	5369.94	69.93	+23	5370.2
7	wn D	41.1324	5371.01	+38	5371.39		....	....	....	....	....	71.41	+23	5371.64
...	....	....	....	....	....		to	41.9240	5373.37	+17	5373.54	73.49	+23	5373.7
8	n B	41.0659	5374.24	+38	5374.62	5	B	41.8970	5374.76	+17	5374.93	74.78	+23	5375.01
3	n D	41.0155	5376.70	+38	5377.08	3	n D	41.8535	5376.87	+17	5377.04	77.06	+23	5377.29
B	from	40.9910	5377.86	+39	5378.25	...	....	....	....	....	....	78.27	+23	5378.5
	....	....	....	....	....	9	wn B	41.7834	5380.28	+18	5380.46	80.45	+23	5380.68
	to	40.9170	5381.48	+40	5381.88	...	....	....	....	....	....	81.90	+23	5382.1
B	from	40.8060	5386.93	+41	5387.34	...	....	....	....	....	....	87.36	+23	5387.6
	....	....	....	....	....	4–5	wn B	41.5280	5392.78	+21	5392.99	92.98	+23	5393.21
	to	40.6730	5393.49	+43	5393.92	...	....	....	....	....	....	93.94	+23	5394.2
...	wn D	40.6217	5396.05	+44	5396.49	3	nn D	41.4562	5396.32	+22	5396.54	96.52	+23	5396.75
B	from	40.5490	5399.64	+45	5400.09	Con. Spec.	from	41.4290	5397.67	+23	5397.90	99.0	+23	5399.±
	to	40.3990	5407.12	+46	5407.58		to	41.2280	5407.64	+25	5407.89	07.74	+23	5408.0
...	nn D	40.3628	5408.95	+46	5409.41	3	n D	41.1914	5409.47	+25	5409.72	09.57	+23	5409.80
3	n B	40.3099	5411.61	+47	5412.08	1	n B	41.1447	5411.80	+26	5412.06	12.07	+23	5412.30
1–2	n D	40.2805	5413.08	+47	5413.55	...	....	....	....	....	....	13.57	+23	5413.80
7-8	wn B	40.2187	5416.20	+48	5416.68	5	n B	41.0490	5416.59	+26	5416.85	16.77	+23	5417.00
...	....	....	....	....	....	3	nn D	40.9813	5420.00	+27	5420.27	20.26	+23	5420.49
3	n B	40.0904	5422.68	+49	5423.17	3	n B	40.9282	5422.98	+28	5423.26	23.22	+23	5423.45
...	....	....	....	....	....	...	nn D	40.8849	5424.86	+28	5425.14	25.13	+23	5425.36
2-3	n B	40.0182	5426.35	+50	5426.85	3	n B	40.8452	5426.87	+28	5427.15	26.95	+23	5427.18
...	nn D	39.9620	5429.19	+51	5429.70	3	D	40.7857	5429.89	+29	5430.18	29.94	+23	5430.17
...	....	....	....	....	....	1	n B	40.7515	5431.63	+30	5431.93	31.92	+23	5432.15
B	from	39.7600	5439.53	+52	5440.05	B	from	40.5920	5439.77	+30	5440.07	40.06	+23	5440.3
	to	39.6680	5444.27	+53	5444.80		to	40.5040	5444.28	+31	5444.59	44.70	+23	5444.9
6	n D	39.6192	5446.82	+53	5447.35	7	n D	40.4520	5446.96	+31	5447.27	47.31	+23	5447.54

115 *SCHJELLERUP—Continued*

Plate G 365						Plate G 374						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
4-5	wn B	39.5588	5449.95	+53	5450.48	4	B	40.3835	5450.49	+32	5450.81	50.65	+24	5450.89
...	....	....	....	....	....	2	nn D	40.2790	5455.90	+33	5456.23	56.22	+24	5456.46
1	n B	39.4024	5458.08	+54	5458.62	...	....	....	....	....	....	58.64	+24	5458.88
...	nn D	39.3679	5459.89	+54	5460.43	1	n D	40.1933	5460.35	+33	5460.68	60.56	+24	5460.80
...	nn D	39.2209	5467.82	+54	5468.36	...	....	....	....	....	....	68.38	+24	5468.62
...	....	....	....	....	....	5	B	39.9759	5471.73	+35	5472.08	72.07	+24	5472.31
1	nn D	39.1130	5473.27	+55	5473.82	1-2	n D	39.9322	5474.03	+35	5474.38	74.10	+24	5474.34
...	nn D	39.0324	5477.56	+55	5478.11	...	....	....	....	....	....	78.13	+24	5478.37
...	nn B	38.9810	5480.30	+55	5480.85	...	nn B	39.8169	5480.12	+36	5480.48	80.67	+24	5480.91
...	nn D	38.9345	5482.78	+56	5483.34	...	....	....	....	....	....	83.36	+24	5483.60
...	....	....	....	....	....	...	nn D	39.4944	5497.31	+38	5497.69	97.68	+24	5497.92
...	....	....	....	....	....	...	nn D	39.4079	5501.96	+38	5502.34	02.33	+24	5502.57
B	from	38.5260	5404.73	+56	5505.29	B	from	39.3740	5503.79	+38	5504.17	04.73	+24	5505.0
	to	38.4400	5509.41	+55	5509.96		to	39.2600	5509.96	+38	5510.34	10.15	+24	5510.4
...	nn D	38.3990	5511.64	+55	5512.19	2	nn D	39.2344	5511.35	+38	5511.73	11.96	+24	5512.20
B	from	38.3620	5513.66	+54	5514.20	...	....	....	....	....	....	14.22	+24	5514.5
	to	38.2000	5522.56	+54	5523.10	...	....	....	....	....	....	23.12	+24	5523.4
...	....	....	....	....	....	2	n D	38.9910	5524.63	+39	5525.02	25.01	+24	5525.25
1	n D	38.0114	5533.01	+54	5533.55	...	nn D	38.8300	5533.50	+39	5533.89	33.72	+24	5533.96
8	n D	37.9073	5538.81	+53	5539.34	8	D	38.7333	5538.86	+39	5539.25	39.30	+24	5539.54
B	from	37.8695	5540.92	+53	5541.45	B	from	38.6890	5541.32	+39	5541.71	41.58	+24	5541.8
	to	37.7840	5545.68	+53	5546.21		to	38.5970	5546.45	+39	5546.84	46.53	+24	5546.8
2	n D	37.7664	5547.26	+52	5547.78	2-3	n D	38.5649	5548.23	+39	5548.62	48.21	+24	5548.45
...	....	....	....	....	....	1-2	D	38.4944	5552.19	+38	5552.57	52.56	+24	5552.80
2	n B	37.6408	5553.77	+52	5554.29	1	n B	38.4655	5553.81	+38	5554.19	54.24	+24	5554.48
2	n D	37.6097	5555.53	+51	5556.04	1	n D	38.4297	5555.82	+38	5556.20	56.12	+24	5556.36
...	....	....	....	....	....	1	n D	38.3238	5561.79	+38	5562.17	62.16	+24	5562.40
1-2	n B	37.4633	5563.84	+50	5564.34	...	nn B	38.2752	5564.54	+38	5564.92	64.63	+24	5564.87
...	....	....	....	....	....	...	n D	38.2353	5566.81	+38	5567.19	67.18	+24	5567.42
	from	37.4080	5566.97	+50	5567.47	...	....	....	....	....	....	67.49	+24	5567.7
B	....	....	....	....	....	Max	B	38.1680	5570.63	+38	5571.01	71.00	+24	5571.24
	to	37.3140	5572.35	+50	5572.85	...	....	....	....	....	....	72.87	+24	5573.1
...	....	....	....	....	....	1	n D	38.0620	5576.68	+38	5577.06	77.05	+24	5577.29
9	D	37.1290	5583.03	+49	5583.52	9	D	37.9469	5583.28	+37	5583.65	83.59	+24	5583.83
...	....	....	....	....	....	Limits	....	37.9810	5581.33	+37	5581.70	81.69	+24	5581.9
...	....	....	....	....	....	Limits	....	37.9120	5585.30	+37	5585.67	85.66	+24	5585.9
Head	....	37.0860	5585.49	+48	5585.97	...	....	....	....	....	....	85.97	+24	5586.21
4	B	37.0640	5586.79	+48	5587.27	6	B	37.8789	5587.20	+37	5587.57	87.42	+24	5587.66
5	B	36.9802	5591.66	+47	5592.13	8	B	37.8008	5591.71	+37	5592.08	92.11	+24	5592.35
B	to	36.9590	5592.86	+47	5593.33	...	....	....	....	....	....	93.35	+24	5593.6
...	nn D	36.9348	5594.31	+46	5594.77	...	n D	37.7512	5594.59	+36	5594.95	94.86	+24	5595.10
6	B	36.8912	5596.85	+46	5597.31	4	n B	37.7065	5597.18	+36	5597.54	97.43	+24	5597.67
...	nn D	36.8469	5599.45	+46	5599.91	1	n D	37.6714	5599.23	+36	5599.59	99.79	+24	5600.03
...	....	....	....	....	....	...	wn D	37.4997	5609.26	+34	5609.60	09.59	+24	5609.83
...	nn D	36.5070	5619.49	+42	5619.91	...	....	....	....	....	....	19.93	+24	5620.17
...	nn D	36.4155	5624.97	+41	5625.38	...	nn D	37.2422	5624.46	+33	5624.79	25.40	+24	5625.64
Con. Spec.	from	36.3890	5626.53	+41	5626.94	Con. Spec.	from	37.1990	5627.03	+32	5627.35	27.15	+24	5627.4
	to	36.3040	5631.62	+40	5632.02		to	37.1180	5631.86	+32	5632.18	32.10	+24	5632.3
10	D	36.2670	5633.88	+40	5634.28	10	D	37.0807	5634.09	+31	5634.40	34.34	+24	5634.58
Head	....	36.2194	5636.74	+40	5637.14	Head	....	37.0310	5637.06	+30	5637.36	37.25	+24	5637.49
B	to	36.1200	5642.73	+39	5643.12	B	to	36.9250	5643.44	+29	5643.73	43.43	+24	5643.7
...	....	....	....	....	....	...	nn D	36.9044	5644.68	+29	5644.97	44.96	+24	5645.20
...	....	....	....	....	....		from	36.8850	5645.85	+29	5646.14	46.13	+24	5646.4
...	n B	36.0730	5645.57	+38	5645.95	B	....	....	....	....	....	45.97	+24	5646.21
...	n B	35.9300	5654.29	+37	5654.66	2	n B	36.7283	5655.34	+27	5655.61	55.1	+25	5655.3
...	....	....	....	....	....		to	36.7140	5656.22	+27	5656.49	56.48	+25	5656.7
...	nn D	35.8754	5657.66	+37	5658.03	...	nn D	36.6963	5657.29	+27	5657.56	57.80	+25	5658.05
...	....	....	....	....	....	Con. Spec.	from	36.6730	5658.71	+27	5658.98	58.97	+25	5659.2
...	....	....	....	....	....		to	36.4910	5669.86	+25	5670.11	70.10	+25	5670.4
1-2	n D	35.6579	5671.07	+34	5671.41	...	....	....	....	....	....	71.43	+25	5671.68
2	n B	35.6220	5673.29	+34	5673.63	2	n B	36.4179	5674.35	+23	5674.58	74.06	+25	5674.31
...	....	....	....	....	....	1	n D	36.3878	5676.20	+23	5676.43	76.42	+25	5676.67
2	n B	35.5207	5679.59	+33	5679.92	2	n B	36.3384	5679.27	+22	5679.49	79.71	+25	5679.96
1-2	n B	35.4630	5683.20	+31	5683.51	2	n B	36.2590	5684.19	+21	5684.40	83.96	+25	5684.21
...	....	....	....	....	....	1	n D	36.2249	5686.31	+21	5686.52	86.51	+25	5686.76

115 *SCHJELLERUP—Continued*

Plate G 365						Plate G 374						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
8	n B	35.2982	5693.54	+30	5693.84	7	n B	36.1055	5693.77	+20	5693.97	93.91	+25	5694.16
1	n D	35.2494	5696.61	+30	5696.91	...	....	....	....	....	....	96.93	+25	5697.18
2	n B	35.2134	5698.89	+29	5699.18	1	n B	36.0236	5698.90	+19	5699.09	99.14	+25	5699.39
4	n B	35.1234	5704.59	+28	5704.87	6	n B	35.9313	5704.72	+18	5704.90	04.89	+25	5705.14
...	....	....	....	....	....	1	n D	35.8845	5707.67	+18	5707.85	07.84	+25	5708.09
2	n B	35.0267	5710.76	+27	5711.03	...	....	....	....	....	....	11.05	+25	5711.30
7	n B	34.9352	5716.61	+26	5716.87	8	n B	35.7407	5716.80	+16	5716.96	16.92	+25	5717.17
5	n B	34.8120	5724.54	+25	5724.79	8	n B	35.6236	5724.28	+14	5724.42	24.61	+25	5724.86
1–2	n D	34.7040	5731.52	+24	5731.76	2	n D	35.5107	5731.53	+14	5731.67	31.72	+25	5731.97
B	from	34.6770	5733.24	+24	5733.48	B	from	35.4920	5732.74	+13	5732.87	33.18	+25	5733.5
	to	34.5390	5742.23	+23	5742.46		to	35.3500	5741.93	+12	5742.05	42.26	+25	5742.6
...	....	....	....	....	....	1	n D	35.3277	5743.37	+12	5743.49	43.48	+25	5743.73
...	....	....	....	....	....	1	n D	35.2492	5748.48	+11	5748.59	48.58	+25	5748.83
	from	34.3820	5752.53	+21	5752.74	...	....	....	....	....	....	52.76	+25	5753.0
B	Max	34.3133	5757.10	+21	5757.31	Max	B	35.1160	5757.19	+10	5757.29	57.30	+25	5757.55
	to	34.2550	5760.92	+20	5761.12	...	....	....	....	....	....	61.14	+25	5761.4
...	....	....	....	....	....	1	n D	35.0335	5762.62	+ 9	5762.71	62.70	+25	5762.95
3	n B	34.1602	5767.26	+19	5767.45	...	nn B	34.9640	5767.21	+ 9	5767.30	67.38	+25	5767.63
...	wn D	34.1017	5771.16	+19	5771.35	...	wn D	34.9088	5770.85	+ 8	5770.93	71.14	+25	5771.39
1–2	n B	34.0310	5775.89	+18	5776.07	1	n B	34.8289	5776.17	+ 8	5776.25	76.16	+25	5776.41
2	n B	33.9660	5780.25	+18	5780.43	1–2	n B	34.7605	5780.72	+ 8	5780.80	80.62	+25	5780.87
...	nn D	33.8890	5785.40	+18	5785.58	...	wn D	34.7040	5784.50	+ 7	5784.57	84.58	+25	5784.83
...	nn D	33.4122	5818.00	+16	5818.16	...	....	....	....	....	....	18.18	+25	5818.43
...	....	....	....	....	....	...	nn D	34.1332	5823.26	+ 6	5823.32	23.31	+25	5823.56
...	nn D	33.3192	5824.45	+16	5824.61	...	....	....	....	....	....	24.63	+25	5824.88
...	nn D	33.2180	5831.46	+16	5831.62	...	....	....	....	....	....	31.64	+25	5831.89
...	....	....	....	....	....	...	nn D	33.7510	5849.83	+ 6	5849.89	49.88	+25	5850.13
...	....	....	....	....	....	...	nn D	33.7283	5851.42	+ 6	5851.48	51.47	+25	5851.72
1–2	n D	32.8919	5854.44	+16	5854.60	...	....	....	....	....	....	54.62	+25	5854.87
...	nn D	32.3880	5890.63	+16	5890.79	...	....	....	....	....	....	90.81	+25	5891.06
...	nn D	32.3010	5897.01	+16	5897.17	...	....	....	....	....	....	97.19	+25	5897.44

152 *SCHJELLERUP*

PLATE G 316 — 1899, March 31, G.M.T. 20h7. Hour angle, W 2h7. Star good; comparison good						PLATE G 394 — 1900, April 4, G.M.T. 17h3. Hour angle, W 2h7. Star excellent; comparison good					
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length
		mm.	t.m.		t.m.			mm.	t.m.		t.m.
Spec. begins		58.9690	4396.20	−10	4396.10	Begins	....	61.7570	4397.10	−17	4396.93
2-3	B	58.6310	4402.40	−12	4402.28	2	n B	61.4442	4402.89	−18	4402.71
3	n D	58.4912	4405.05	−13	4404.92	...	....	....	....	....	....
D	from	58.5770	4403.40	−12	4403.28	D	from	61.4100	4403.60	−18	4403.42
	to	58.2540	4409.50	−15	4409.35		to	61.0700	4410.10	−20	4409.90
1	n D	58.1867	4410.75	−16	4410.59	...	....	....	....	....	....
1	n D	58.0933	4412.51	−17	4412.34	1	n D	60.9170	4412.93	−20	4412.73
4	n D	57.9313	4415.57	−18	4415.39	3	nn D	60.7711	4415.73	−21	4415.52
1	B	57.6350	4421.02	−20	4420.82	...	....	....	....	....	....
2	B	57.4832	4424.10	−21	4423.89	...	....	....	....	....	....
2	n D	57.3827	4426.03	−22	4425.81	...	....	....	....	....	....
2	n D	57.2937	4427.75	−23	4427.52	2	n D	60.1277	4428.24	−25	4427.99
1-2	nn D	57.1416	4430.69	−24	4430.45	3-4	n D	60.0007	4430.72	−25	4430.47
6	w D	56.8532	4436.28	−26	4436.02	...	wn D	59.7280	4436.20	−27	4435.93
1	n D	56.7420	4438.46	−28	4438.18	...	....	....	....	....	....
1	nn D	56.4200	4444.80	−30	4444.50	1	n D	59.2771	4445.09	−29	4444.80
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
2-3	n D	56.2754	4447.64	−31	4447.33	1	n D	59.1274	4448.11	−29	4447.82
...	wn D	56.1260	4450.60	−32	4450.28	...	....	....	....	....	....
...	....	....	....	....	....	1	u D	58.7524	4455.71	−31	4455.40
...	....	....	....	....	....	1	n D	58.6200	4458.41	−31	4458.10
1	B	55.7027	4459.09	−35	4458.74	...	....	....	....	....	....
...	wn D	55.6427	4460.30	−36	4459.94	...	....	....	....	....	....
4-5	n D	55.5430	4462.30	−36	4461.94	...	wn D	58.4201	4462.51	−32	4462.19
...	....	....	....	....	....	...	....	....	....	....	....
5	B	55.4503	4464.19	−37	4463.82	8	B	58.3192	4464.58	−32	4464.26
Con.	from	55.4130	4464.95	−37	4464.58	...	....	....	....	....	....
...	....	....	....	....	....	1	n D	58.1140	4468.83	−33	4468.50
...	....	....	....	....	....	1	n•D	57.9535	4472.16	−33	4471.83
...	....	....	....	....	....	...	....	....	....	....	....
Spec.	to	55.0190	4473.00	−38	4472.62	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
...	wn B	54.9770	4473.90	−38	4473.52	...	....	....	....	....	....
...	wn B	54.7200	4479.20	−40	4478.80	...	....	....	....	....	....
2	n D	54.6613	4480.38	−40	4479.98	...	....	....	....	....	....
2	n D	54.5512	4482.67	−41	4482.26	1	n D	57.4410	4482.95	−35	4482.60
	from	54.5220	4483.28	−41	4482.87	...	....	....	....	....	....
Unre-	....	....	....	....	....	1	n D	57.3413	4485.03	−35	4484.68
solv'd	....	....	....	....	....	1	nn D	57.2196	4487.62	−35	4487.27
	to	54.2850	4488.20	−42	4487.78	...	....	....	....	....	....
1	B	54.2598	4488.76	−42	4488.34	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
3-4	D	54.1951	4490.12	−42	4489.70	2	D	57.1107	4489.94	−36	4489.58
Unre-	from	54.1600	4490.86	−42	4490.44	...	....	....	....	....	....
solv'd	to	53.5890	4502.98	−44	4502.54	1	n D	56.5255	4502.54	−37	4502.17
...	....	....	....	....	....	2-3	nn B	56.4500	4504.18	−37	4503.81
1	n D	53.4888	4505.13	−44	4504.69	1	n D	56.3958	4505.36	−37	4504.99
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	2-3	nn B	56.3454	4506.46	−37	4506.09
2-3	nn D	53.3745	4507.58	−44	4507.14	1	nn D	56.2874	4507.73	−37	4507.36
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	1	nn D	56.0377	4513.21	−38	4512.83
1	nn D	52.9640	4516.48	−44	4516.04	...	....	....	....	....	....
1	B	52.9100	4517.66	−44	4517.22	...	....	....	....	....	....
1-2	wn D	52.8577	4518.80	−44	4518.36	...	....	....	....	....	....
1	nn D	52.7749	4520.62	−44	4520.18	...	....	....	....	....	....
6	n D	52.6402	4523.58	−44	4523.14	4	n D	55.5652	4523.69	−38	4523.31
4	B	52.5804	4524.89	−44	4524.45	6	B	55.4965	4525.16	−38	4524.78
1-2	nn D	5205.12	4536.66	−43	4536.23	...	....	....	....	....	....

152 SCHJELLERUP

PLATE A 313 1902, February 10, G.M.T. 18^h3. Hour angle, E 2^h8 Star good; comparison good						PLATE A 319 1902, February 18, G.M.T. 17^h7. Hour angle, E 3^h0 Star excellent; comparison good						MEAN WAVE-LENGTH		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
...	....	....	....	....	....	...	....	....	....	....	....	96.52	− 1	4396.5
...	....	....	....	....	....	...	....	....	....	....	....	02.71	− 1	4402.70
...	....	....	....	....	....	...	....	....	....	....	....	04.92	− 1	4404.91
...	....	....	....	....	....	...	....	....	....	....	....	03.35	− 1	4403.3
...	....	....	....	....	....	...	....	....	....	....	....	09.63	− 1	4409.6
...	....	....	....	....	....	...	....	....	....	....	....	10.59	− 1	4410.58
...	....	....	....	....	....	2	D	35.2114	4413.02	−70	4412.32	12.46	− 1	4412.45
...	....	....	....	....	....	...	....	....	....	....	....	15.46	− 1	4415.45
...	....	....	....	....	....	...	....	....	....	....	....	20.82	− 1	4420.81
...	....	....	....	....	....	...	....	....	....	....	....	23.89	− 1	4423.88
...	....	....	....	....	....	...	....	....	....	....	....	25.81	− 1	4425.80
...	....	....	....	....	....	...	nn D	36.4720	4428.40	−67	4427.73	27.75	− 1	4427.74
...	....	....	....	....	....	...	nn D	36.7110	4431.39	−66	4430.73	30.55	− 1	4430.54
...	....	....	....	....	....	...	....	....	....	....	....	35.98	− 1	4435.97
...	....	....	....	....	....	2	n D	37.3194	4438.98	−65	4438.33	38.26	− 1	4438.25
...	nn D	39.7434	4444.63	+ 9	4444.72	...	wn D	37.8153	4445.23	−64	4444.59	44.65	− 1	4444.64
...	....	....	....	....	....	2	B	37.8728	4445.96	−63	4445.33	45.33	− 1	4445.32
...	....	....	....	....	....	2	D	37.9097	4446.43	−63	4445.80	45.80	− 1	4445.79
...	....	....	....	....	....	1	n B	37.9552	4447.01	−63	4446.38	46.38	− 1	4446.37
...	....	....	....	....	....	...	....	....	....	....	....	47.58	− 1	4447.57
...	....	....	....	....	....	...	....	....	....	....	....	50.28	− 2	4450.3
...	....	....	....	....	....	...	....	....	....	....	....	55.40	− 2	4455.38
...	....	....	....	....	....	...	....	....	....	....	....	58.10	− 2	4458.08
...	....	....	....	....	....	...	....	....	....	....	....	58.74	− 2	4458.72
...	....	....	....	....	....	...	....	....	....	....	....	59.94	− 2	4459.92
...	....	....	....	....	....	...	....	....	....	....	....	62.07	− 2	4462.05
...	....	....	....	....	....	1	n D	39.2880	4464.14	−58	4463.56	63.56	− 2	4463.54
2	n B	41.2680	4464.30	+ 5	4464.35	2	n B	39.3297	4464.68	−58	4464.10	64.11	− 2	4464.09
...	n D	41.3094	4464.85	+ 5	4464.90	...	....	....	....	....	....	64.58	− 2	4464.6
...	....	....	....	....	....	...	....	....	....	....	....	64.90	− 2	4464.88
...	....	....	....	....	....	...	....	....	....	....	....	68.50	− 2	4468.48
...	....	....	....	....	....	...	....	....	....	....	....	71.83	− 2	4471.81
...	....	....	....	....	....	...	....	....	....	....	....	72.62	− 2	4472.6
...	....	....	....	....	....	1	n B	39.9765	4473.14	−55	4472.59	72.59	− 2	4472.57
...	....	....	....	....	....	2	D	40.0205	4473.72	−55	4473.17	73.17	− 2	4473.15
...	....	....	....	....	....	3	n B	40.0547	4474.18	−55	4473.63	73.58	− 2	4473.56
...	....	....	....	....	....	...	....	....	....	....	....	78.80	− 2	4478.78
...	....	....	....	....	....	...	....	....	....	....	....	79.98	− 2	4479.96
...	....	....	....	....	....	2	n D	40.7209	4483.02	−52	4482.50	82.45	− 2	4482.43
...	....	....	....	....	....	...	....	....	....	....	....	82.87	− 2	4482.9
...	....	....	....	....	....	1	n D	40.9565	4486.17	−51	4485.66	85.17	− 2	4485.15
...	....	....	....	....	....	...	nn D	41.0800	4487.83	−50	4487.33	87.30	− 2	4487.28
...	....	....	....	....	....	...	....	....	....	....	....	87.78	− 2	4487.8
...	....	....	....	....	....	1	n B	41.1350	4488.57	−50	4488.07	88.21	− 2	4488.19
...	....	....	....	....	....	1-2	D	41.1630	4488.95	−50	4488.45	88.45	− 2	4488.43
...	....	....	....	....	....	1	n B	41.1932	4489.35	−49	4488.86	88.86	− 2	4488.84
...	....	....	....	....	....	...	nn D	41.2490	4490.10	−49	4489.61	89.63	− 2	4489.61
...	....	....	....	....	....	...	....	....	....	....	....	90.44	− 2	4490.4
...	....	....	....	....	....	...	....	....	....	....	....	02.17	− 2	4502.15
...	....	....	....	....	....	...	....	....	....	....	....	03.81	− 2	4503.79
...	....	....	....	....	....	...	....	....	....	....	....	04.84	− 2	4504.82
...	....	....	....	....	....	3	n D	42.3950	4505.73	−44	4505.29	05.29	− 2	4505.27
...	....	....	....	....	....	2	n B	42.4478	4506.45	−44	4506.01	06.05	− 2	4506.03
...	....	....	....	....	....	...	nn D	42.5395	4507.72	−44	4507.28	07.26	− 2	4507.24
...	....	....	....	....	....	3	n D	42.7340	4510.41	−43	4509.98	09.98	− 2	4509.96
...	....	....	....	....	....	...	....	....	....	....	....	12.83	− 2	4512.81
...	....	....	....	....	....	...	....	....	....	....	....	16.04	− 2	4516.02
...	....	....	....	....	....	...	....	....	....	....	....	17.22	− 2	4517.20
...	....	....	....	....	....	...	n D	43.3162	4518.53	−40	4518.13	18.25	− 2	4518.23
...	....	....	....	....	....	...	....	....	....	....	....	20.18	− 2	4520.16
...	....	....	....	....	....	...	....	....	....	....	....	23.23	− 2	4523.21
1	n B	45.7022	4524.74	+ 1	4524.75	3	B	43.7754	4524.99	−37	4524.62	24.65	− 2	4524.63
...	....	....	....	....	....	...	....	....	....	....	....	36.23	− 2	4536.21

152 *SCHJELLERUP — Continued*

PLATE G 316						PLATE G 394					
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length
		mm.	t.m.		t.m.			mm.	t.m.		t.m.
...	....	....	....	....	....		from	54.9510	4537.60	−38	4537.22
4	n B	51.9974	4537.86	−42	4537.44		....	....	....	....	....
...	....	....	....	....	....	B	....	....	....	....	....
4	n B	51.9255	4539.48	−42	4539.06		....	....	....	....	....
...	....	....	....	....	....		to	54.8170	4540.60	−38	4540.22
1	n D	51.8711	4540.70	−42	4540.28	1	n D	54.7986	4541.02	−38	4540.64
...	....	....	....	....	....	...	....	....	....	....	....
...	wn D	51.6280	4543.94	−41	4543.53	...	....	....	....	....	... ...
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	...	w D	54.5651	4546.37	−38	4545.99
5	n B	51.5481	4548.02	−41	4547.61	3	n B	54.4856	4548.20	−38	4547.82
5	n D	51.4797	4549.57	−41	4549.16	6	w D	54.4166	4549.80	−38	4549.42
...	....	....	....	....	....	...	wn D	54.2770	4553.04	−37	4552.67
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
2	n D	50.9920	4560.77	−38	4560.39	...	D	53.9320	4561.08	−37	4560.71
...	....	....	....	....	....	...	....	....	....	....	....
1	n D	50.8720	4563.55	−38	4563.17	3	n D	53.8097	4563.96	−37	4563.59
2	n B	50.8120	4564.94	−38	4564.56	...	....	....	....	....	....
1	n D	50.7657	4566.02	−37	4565.65	2	n D	53.7012	4566.52	−36	4566.16
2	n B	50.6820	4567.98	−37	4567.61	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....		from	53.4990	4571.32	−36	4570.96
...	....	....	....	....	....	D	....	....	....	....	....
...	....	....	....	....	....		to	53.1870	4578.77	−35	4578.42
...	....	....	....	....	....	...	....	....	....	....	....
2	n B	50.1998	4579.32	−34	4578.98	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
1	nn D	50.1380	4580.79	−34	4580.45	2	n D	53.1010	4580.84	−35	4580.49
1-2	nn B	50.0925	4581.87	−34	4581.53	...	....	....	....	....	....
...	....	....	....	....	....	1	n D	52.9990	4583.30	−34	4582.96
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
1	nn D	49.8175	4588.43	−33	4588.10	...	....	....	....	....	....
...	....	....	....	....	....		....	....	....	....	....
...	....	....	....	....	....		from	52.7520	4589.28	−33	4588.95
...	....	....	....	....	....		....	....	....	....	....
...	....	....	....	....	....	B	....	....	....	....	....
...	....	....	....	....	....		....	....	....	....	....
...	....	....	....	....	....		....	....	....	....	....
...	....	....	....	....	....		to	52.5790	4593.50	−33	4593.17
2	n D	49.5760	4594.25	−31	4593.94	1	n D	52.5471	4594.28	−33	4593.95
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	Max	B	52.4862	4595.77	−33	4595.44
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
2	nn D	49.4420	4597.50	−31	4597.19	...	....	....	....	....	....
Max	B	49.3580	4599.54	−30	4599.24	...	....	....	....	....	....
...	....	....	....	....	....	1	n D	52.2643	4601.23	−32	4600.91
...	....	....	....	....	....	...	....	....	....	....	....
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...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
Max	B	48.8170	4612.81	−28	4612.53	...	....	....	....	....	....
1-2	D	48.7710	4613.94	−27	4613.67	1	n D	51.7387	4614.32	−29	4614.03
2	n B	48.7111	4615.43	−27	4615.16	...	....	....	....	....	....
2	n D	48.6600	4616.70	−26	4616.44	4	n D	51.6393	4616.82	−29	4616.53
8	B	48.5962	4618.29	−26	4618.03	7	B	51.5719	4618.52	−28	4618.24
4	D	48.5380	4619.74	−26	4619.48	2	D	51.5169	4619.90	−28	4619.62
1-2	n D	48.4222	4622.63	−25	4622.38	1	n D	51.4000	4622.88	−28	4622.60
...	....	....	....	....	....	1	n D	51.2770	4626.00	−27	4625.73
...	....	....	....	....	....	...	....	....	....	....	....
1	n D	47.8027	4638.30	−21	4638.09	...	....	....	....	....	....

152 *SCHJELLERUP—Continued*

Plate A 313						Plate A 319						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
...	....	....	....	....	....	...	....	....	....	....	....	....	– 2	4537.2
1	n B	46.6190	4537.87	+ 1	4537.88	2–3	n B	44.6949	4538.11	–32	4537.79	37.70	– 2	4537.68
2	n D	46.6693	4538.60	+ 2	4538.62	5	D	44.7372	4538.72	–32	4538.40	38.51	– 2	4538.49
1	n B	46.7195	4539.32	+ 2	4539.34	8	B	44.7878	4539.45	–31	4539.14	39.18	– 2	4539.16
...	....	....	....	....	....	...	....	....	....	....	....	40.22	– 2	4540.2
...	....	....	....	....	....	...	nn D	44.8790	4540.77	–31	4540.46	40.46	– 2	4540.44
...	....	....	....	....	....	2–3	n D	45.0277	4542.92	–30	4542.62	43.08	– 2	4543.06
...	....	....	....	....	....	...	....	....	....	....	....	43.53	– 2	4543.51
...	....	....	....	....	....	1	n B	45.1307	4544.41	–29	4544.12	44.12	– 2	4544.10
...	....	....	....	....	....	1	D	45.1970	4545.38	–29	4545.09	45.54	– 2	4545.5
2	n B	47.3029	4547.82	+ 2	4547.84	6	B	45.3773	4548.00	–28	4547.72	47.75	– 2	4547.73
...	....	....	....	....	....	...	....	....	....	....	....	49.29	– 2	4549.27
...	....	....	....	....	....	...	....	....	....	....	....	52.67	– 2	4552.65
1	n B	47.8705	4556.17	+ 3	4556.20	1	n B	45.9431	4556.30	–25	4556.05	56.05	– 2	4556.03
...	....	....	....	....	....	1	n B	46.1360	4559.10	–23	4558.87	58.87	– 2	4558.85
...	....	....	....	....	....	...	nn D	46.1780	4559.80	–22	4559.58	60.23	– 2	4560.21
...	....	....	....	....	....	1	n B	46.3627	4562.51	–22	4562.29	62.29	– 2	4562.27
...	....	....	....	....	....	1	D	46.4690	4564.20	–21	4563.99	63.58	– 2	4563.56
2	n B	48.4499	4564.80	+ 5	4564.85	3–4	n B	46.5230	4564.90	–21	4564.69	64.70	– 2	4564.68
...	....	....	....	....	....	5	D	46.5964	4565.99	–20	4565.79	65.87	– 2	4565.85
1	n D	48.6107	4567.21	+ 5	4567.26	2	D	46.6857	4567.33	–20	4567.13	67.20	– 2	4567.18
2	n B	48.6497	4567.80	+ 5	4567.85	3	B	46.7274	4567.95	–20	4567.75	67.74	– 2	4567.72
1	n B	48.8192	4570.34	+ 5	4570.39	3	B	46.8945	4570.45	–19	4570.26	70.33	– 2	4570.31
...	....	....	....	....	....	...	....	....	....	....	....	70.96	– 2	4570.9
...	....	....	....	....	....	2	D	47.3845	4577.85	–16	4577.69	77.69	– 2	4577.67
...	....	....	....	....	....	...	....	....	....	....	....	78.42	– 2	4578.4
...	....	....	....	....	....	1–2	B	47.4429	4578.74	–16	4578.58	78.78	– 2	4578.76
1	n D	49.4009	4579.16	+ 7	4579.23	2	D	47.4832	4579.35	–16	4579.19	79.21	– 2	4579.19
...	....	....	....	....	....	1–2	B	47.5162	4579.85	–16	4579.69	79.69	– 2	4579.67
2	n D	49.4940	4580.59	+ 7	4580.66	4	D	47.5667	4580.62	–15	4580.47	80.52	– 2	4580.50
...	....	....	....	....	....	2	B	47.6152	4581.36	–15	4581.21	81.37	– 2	4581.35
...	....	....	....	....	....	1	B	47.7889	4584.01	–13	4583.88	82.96	– 2	4582.94
...	....	....	....	....	....	...	....	....	....	....	....	83.88	– 2	4583.86
...	....	....	....	....	....	...	n D	47.8447	4584.86	–12	4584.74	84.74	– 2	4584.72
...	....	....	....	....	....	2	D	47.9517	4586.50	–11	4586.39	86.39	– 2	4586.37
...	....	....	....	....	....	...	....	....	....	....	....	88.95	– 2	4588.9
...	....	....	....	....	....	2	B	48.1270	4589.19	–10	4589.09	89.09	– 2	4589.07
...	nn D	50.0940	4589.81	+ 8	4589.89	3	D	48.1742	4589.92	–10	4589.82	89.86	– 2	4589.84
...	....	....	....	....	....	1	n B	48.2210	4590.65	– 9	4590.56	90.56	– 2	4590.54
2	nn D	50.1904	4591.30	+ 9	4591.39	2	D	48.2588	4591.23	– 8	4591.15	91.27	– 2	4591.25
1–2	n B	50.2325	4591.95	+ 9	4592.04	3	B	48.3040	4591.93	– 8	4591.85	91.95	– 2	4591.93
...	....	....	....	....	....	...	....	....	....	....	....	93.17	– 2	4593.2
...	....	....	....	....	....	4–5	D	48.4403	4594.03	– 8	4593.95	93.95	– 2	4593.93
...	....	....	....	....	....		from	48.4810	4594.70	– 7	4594.63	94.63	– 2	4594.6
...	....	....	....	....	....	B	....	....	....	....	....	95.44	– 2	4595.42
...	....	....	....	....	....		to	48.5650	4596.00	– 7	4595.93	95.93	– 2	4595.9
...	....	....	....	....	....	4	n D	48.6163	4596.77	– 6	4596.71	96.71	– 2	4596.69
...	....	....	....	....	....	1	D	48.6999	4597.64	– 6	4597.58	97.39	– 2	4597.37
...	....	....	....	....	....	...	....	....	....	....	....	99.24	– 2	4599.22
...	....	....	....	....	....	...	....	....	....	....	....	00.91	– 2	4600.89
...	....	....	....	....	....	1	n B	48.9722	4602.32	– 3	4602.29	02.29	– 2	4602.27
...	....	....	....	....	....	...	nn D	49.0083	4602.88	– 3	4602.85	02.85	– 2	4602.83
...	....	....	....	....	....	...	wn D	49.2316	4606.39	0	4606.39	06.39	– 2	4606.37
...	....	....	....	....	....	...	n D	49.3930	4608.93	+ 1	4608.94	08.94	– 2	4608.92
...	....	....	....	....	....	2	D	49.5517	4611.44	+ 2	4611.46	11.46	– 2	4611.44
...	....	....	....	....	....	2	B	49.5840	4611.95	+ 2	4611.97	12.25	– 2	4612.23
...	....	....	....	....	....	3	D	49.7190	4614.10	+ 4	4614.14	13.95	– 2	4613.93
...	....	....	....	....	....	...	....	....	....	....	....	15.16	– 2	4615.14
4	B	51.8908	4618.08	+16	4618.24	8	w D	49.8564	4616.28	+ 4	4616.32	16.44	– 2	4616.42
3–4	D	51.9645	4619.23	+16	4619.39	5	B	49.9700	4618.10	+ 5	4618.15	18.17	– 2	4618.15
...	....	....	....	....	....	4–5	n D	50.0348	4619.13	+ 5	4619.18	19.42	– 2	4619.40
...	....	....	....	....	....	...	....	....	....	....	....	22.49	– 2	4622.47
...	....	....	....	....	....	...	....	....	....	....	....	25.73	– 2	4625.71
1	n B	52.5785	4629.18	+18	4629.36	...	....	....	....	....	....	29.36	– 2	4629.34
...	....	....	....	....	....	...	....	....	....	....	....	38.09	– 2	4638.07

152 *SCHJELLERUP — Continued*

PLATE G 316						PLATE G 394					
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length
		t.m.	t.m.		t.m.			mm.	t.m.		t.m.
...	....	....	....	....	....	...	....	....	....	....	....
4	B	47.7669	4639.22	−21	4639.01	3	B	50.7557	4639.39	−24	4639.15
5 6	D	47.7045	4640.82	−20	4640.62	4–5	D	50.6933	4641.01	−24	4640.77
...	No details in blue band			....	....	...	....	....	....	....	....
...	w D	44.1820	4736.50	+ 8	4736.58	...	....	....	....	....	....
B {	from	44.1180	4738.35	+ 8	4738.43	...	....	....	....	....	....
	....	44.0790	4739.47	+ 8	4739.55	0–1	B	47.1154	4739.50	− 2	4739.48
	to	44.0160	4741.30	+ 8	4741.38	...	....	....	....	....	....
...	....	....	....	....	....	D {	from	47.0840	4740.42	− 2	4740.40
B {	from	43.8840	4745.12	+10	4745.22		to	46.9020	4745.76	− 1	4745.75
		43.8340	4746.58	+10	4746.68	Max {	B	46.8439	4747.46	− 1	4747.45
	to	43.7430	4749.24	+11	4749.35		to	46.7800	4749.34	0	4749.34
...	w D	43.6758	4751.19	+11	4751.30	...	w D	46.7093	4751.43	0	4751.43
...	Head	43.6242	4752.70	+11	4752.81		Head	46.6466	4753.29	0	4753.29
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	...	wn D	46.4490	4759.18	+ 1	4759.19
Max	B	43.3482	4760.84	+13	4760.97	2	B	46.3903	4760.93	+ 1	4760.94
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
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..	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
Max	B	42.8738	4775.01	+16	4775.17	3	n B	45.9100	4775.43	+ 3	4775.46
...	....	....	....	....	....	1	n D	45.8620	4776.89	+ 3	4776.92
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	1	n D	45.7700	4779.70	+ 3	4779.73
...	....	....	....	....	....	2	n B	45.6740	4782.64	+ 3	4782.67
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
Max	B	42.3345	4791.39	+18	4791.57	2	n B	45.3800	4791.71	+ 4	4791.75
...	....	....	....	....	....	...	....	....	....	....	....
Max	B	42.2206	4795.89	+18	4796.07	3	n B	45.2600	4795.44	+ 4	4795.48
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
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1–2	n D	41.5465	4815.91	+20	4816.11	2	nn D	44.5980	4816.28	+ 5	4816.33
1	B	41.3355	4822.59	+20	4822.79	...	....	....	....	....	....
1–2	nn D	41.3007	4823.69	+20	4823.89	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
4–5	B	41.2325	4825.87	+20	4826.07	4	n B	44.2948	4825.99	+ 5	4826.04
...	....	....	....	....	....	...	....	....	....	....	....
2–3	n D	41.1665	4827.97	+20	4828.17	2	n D	44.2250	4828.24	+ 5	4828.29
5	B	41.0973	4830.19	+20	4830.39	4	n B	44.1494	4830.68	+ 5	4830.73
4	n D	41.0302	4832.34	+20	4832.54	5	D	44.0887	4832.65	+ 5	4832.70
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
1–2	nn D	40.6867	4843.45	+19	4843.64	1–2	n D	43.7565	4843.49	+ 5	4843.54
1	B	40.6368	4845.07	+18	4845.25	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
1	n D	40.4305	4851.82	+17	4851.99	...	....	....	....	....	....
1	n D	40.3055	4855.93	+17	4856.10	...	....	....	....	....	....
...	....	....	....	....	....	...	....	....	....	....	....
...	....	....	....	....	....	2–3	B	43.3169	4858.03	+ 4	4858.07
...	....	....	....	....	....	...	....	....	....	....	....
1	n D	40.2020	4859.36	+16	4859.52	1	nn D	43.2659	4859.74	+ 4	4859.78
...	....	....	....	....	....	...	....	....	....	....	....

152 *SCHJELLERUP—Continued*

Plate A 313						Plate A 319						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
1	nB	53.1800	4639.01	+20	4639.21	...	n B	51.2564	4638.58	+16	4638.74	38.98	– 2	4638.96
...	nn D	53.2447	4640.07	+20	4640.27	...	w D	51.3495	4640.44	+17	4640.61	40.57	– 2	4640.55
...	....	....	....	....	....	...	....	....	....	....	....	.....	....	....
...	....	....	....	....	....	...	....	....	....	....	....	.....	....	....
...	....	....	....	....	....	...	....	....	....	....	....	36.58	– 2	4736.6
...	....	....	....	....	....	...	....	....	....	....	....	38.43	– 2	4738.4
...	....	....	....	....	....	...	....	....	....	....	....	39.52	– 2	4739.50
...	....	....	....	....	....	...	....	....	....	....	....	41.38	– 2	4741.3
...	....	....	....	....	....	...	....	....	....	....	....	40.40	– 2	4740.4
...	....	....	....	....	....	...	....	....	....	....	....	45.49	– 2	4745.4
...	....	....	....	....	....	...	....	....	....	....	....	47.07	– 2	4747.05
...	....	....	....	....	....	...	....	....	....	....	....	49.35	– 2	4749.3
10	D	59.5727	4751.44	+35	4751.79	...	w D	57.6313	4750.76	+55	4751.31	51.61	– 2	4751.59
...	Head	59.6444	4752.79	+35	4753.14	...	Head	57.7213	4752.45	+56	4753.01	53.08	– 2	4753.06
1	n D	59.8052	4755.82	+36	4756.18	2	n B	57.8319	4754.53	+56	4755.09	55.09	– 2	4755.07
...	....	....	....	....	....	...	n D	57.8842	4755.52	+56	4756.08	56.13	– 2	4756.11
4	B	59.8510	4756.69	+36	4757.05	4	n B	57.9359	4756.50	+56	4757.06	57.06	– 2	4757.04
3	n D	59.9817	4759.17	+36	4759.53	1	n D	58.0577	4758.80	+56	4759.36	59.36	– 2	4759.34
...	wn B	60.0465	4760.40	+36	4760.76	4	wn B	58.1228	4760.04	+57	4760.61	60.82	– 2	4760.80
2	D	60.1305	4762.00	+36	4762.36	...	....	....	....	....	....	62.36	– 2	4762.34
3	n B	60.1845	4763.03	+36	4763.39	3	B	58.2691	4762.82	+57	4763.39	63.39	– 2	4763.37
...	nn D	60.2373	4764.03	+36	4764.39	1	n D	58.3085	4763.57	+57	4764.14	64.27	– 2	4764.45
3	n B	60.2969	4765.17	+36	4765.53	...	....	....	....	....	....	65.47	– 2	4765.45
2–3	n D	60.3575	4766.33	+36	4766.69	1	n D	58.4280	4765.85	+57	4766.42	66.56	– 2	4766.54
...	....	....	....	....	....	2	n B	58.5080	4767.38	+58	4767.96	67.96	– 2	4767.94
1	n D	60.4615	4768.32	+36	4768.68	...	....	....	....	....	....	68.68	– 2	4768.66
...	....	....	....	....	....	1	n B	58.5907	4768.96	+58	4769.54	69.60	– 2	4769.58
3	n B	60.7943	4774.73	+36	4775.09	5	n B	58.8769	4774.47	+59	4775.06	75.20	– 2	4775.18
2	n D	60.8794	4776.38	+37	4776.75	...	....	....	....	....	....	76.84	– 2	4776.82
...	....	....	....	....	....	1	n B	59.0264	4777.36	+59	4777.95	77.95	– 2	4777.93
...	nn D	61.0210	4779.12	+37	4779.49	...	....	....	....	....	....	79.61	– 2	4779.59
Max	B	61.1822	4782.26	+37	4782.63	4	n B	59.2639	4781.97	+60	4782.57	82.62	– 2	4782.60
1	n D	61.2984	4784.52	+37	4784.89	...	....	....	....	....	....	84.86	– 2	4784.84
1	n D	61.3982	4786.48	+37	4786.85	...	....	....	....	....	....	86.85	– 2	4786.83
...	nn D	61.5374	4789.21	+37	4789.58	1–2	n D	59.6324	4789.18	+60	4789.78	89.68	– 2	4789.66
...	....	....	....	....	....	...	....	....	....	....	....	91.66	– 2	4791.64
...	....	....	....	....	....	...	nn D	59.7952	4792.37	+60	4792.97	92.97	– 2	4792.95
...	....	....	....	....	....	...	....	....	....	....	....	95.78	– 2	4795.76
...	nn D	62.0592	4799.52	+37	4799.89	...	....	....	....	....	....	99.89	– 2	4799.87
1	n D	62.2115	4802.55	+37	4802.92	...	....	....	....	....	....	02.92	– 2	4802.90
...	nn D	62.3107	4804.53	+37	4804.90	1	n D	60.3925	4804.23	+62	4804.85	04.88	– 2	4804.86
...	nn D	62.4029	4806.37	+37	4806.74	1	n D	60.4774	4805.91	+62	4806.53	06.64	– 2	4806.62
...	nn D	62.8620	4815.62	+37	4815.99	1	n D	60.9689	4815.80	+62	4816.42	16.17	– 2	4816.15
...	....	....	....	....	....	...	....	....	....	....	....	22.79	– 2	4822.77
...	nn D	63.2535	4823.57	+37	4823.94	2	n D	61.3327	4823.19	+62	4823.81	23.88	– 2	4823.86
	from	63.2930	4824.38	+37	4824.75	...	B	61.4160	4824.89	+62	4825.51	24.75	– 2	4824.7
B	....	....	....	....	....	...	....	....	....	....	....	25.87	– 2	4825.85
	to	63.3985	4826.54	+37	4826.91	...	....	....	....	....	....	26.91	– 2	4826.9
2	n D	63.4327	4827.24	+37	4827.61	1	n D	61.5210	4827.04	+62	4827.66	27.92	– 2	4827.90
2–3	n B	63.5830	4830.32	+37	4830.69	6	n B	61.6592	4829.87	+62	4830.49	30.58	– 2	4830.56
5	n D	63.6652	4832.02	+37	4832.39	6	D	61.7464	4831.67	+62	4832.29	32.48	– 2	4832.46
Con.	from	63.7715	4834.21	+37	4834.58	...	....	....	....	....	....	34.58	– 2	4834.6
...	....	....	....	....	....	0	n D	62.0692	4838.34	+61	4838.95	38.95	– 2	4838.93
Spec.	to	64.1420	4841.90	+37	4842.27	...	....	....	....	....	....	42.27	– 2	4842.3
...	nn D	64.2053	4843.22	+37	4843.59	2	n D	62.2755	4842.63	+61	4843.24	43.50	– 2	4843.48
2	n B	64.2782	4844.74	+37	4845.11	...	....	....	....	....	....	45.18	– 2	4845.16
Con.	from	64.3135	4845.48	+36	4845.84	...	....	....	....	....	....	45.84	– 2	4845.8
Spec.	to	64.5650	4850.75	+36	4851.11	...	....	....	....	....	....	51.11	– 2	4851.1
...	nn D	64.5997	4851.48	+36	4851.84	...	....	....	....	....	....	51.93	– 2	4851.91
...	....	....	....	....	....	...	....	....	....	....	....	56.10	– 2	4856.08
Con.	from	64.8325	4856.39	+36	4856.75	...	....	....	....	....	....	56.75	– 2	4856.7
...	....	....	....	....	....	...	....	....	....	....	....	58.07	– 2	4858.05
Spec.	to	64.9455	4858.79	+36	4859.15	...	....	....	....	....	....	59.15	– 2	4859.1
1	n D	64.9647	4859.20	+36	4859.56	...	....	....	....	....	....	59.67	– 2	4859.65
1–2	n B	65.0206	4860.38	+36	4860.74	...	....	....	....	....	....	60.74	– 2	4860.72

152 *SCHJELLERUP — Continued*

PLATE G 316

Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length
		mm.	t.m.		t.m.
1	n D	40.1160	4862.22	+16	4862.38
1	n D	40.0289	4865.10	+15	4865.25
...	....	....	....	....	....
...	....	....	....	....	....
4	D	39.8491	4871.11	+14	4871.25
2	D	39.7203	4875.44	+13	4875.57
1	D	39.6320	4878.42	+12	4878.54
2	B	39.6013	4879.46	+12	4879.58
5	D	39.5428	4881.44	+12	4881.56
5	B	39.4800	4883.57	+12	4883.69
...	....	....	....	....	....
3-4	D	39.4144	4885.80	+11	4885.91
...	....	....	....	....	....
...	....	....	....	....	....
...	....	....	....	....	....
...	....	....	....	....	....
3-4	B	39.1854	4893.64	+ 9	4893.73
...	....	....	....	....	....
6-8	w B	39.0383	4898.71	+ 9	4898.80
...	....	....	....	....	....
3	D	38.9761	4900.86	+ 8	4900.94
...	....	....	....	....	....
7	B	38.8935	4903.73	+ 7	4903.80
...	....	....	....	....	....
4	n D	38.8123	4906.55	+ 6	4906.61
...	....	....	....	....	....
2	n D	38.7063	4910.25	+ 5	4910.30
4-5	nn D	38.4139	4920.54	+ 2	4920.56
...	....	....	....	....	....
...	....	....	....	....	....
...	....	....	....	....	....
2	n B	37.7610	4943.91	− 5	4943.86
1-2	nn D	37.7064	4945.90	− 7	4945.83
1-2	B	37.6511	4947.90	− 7	4947.83
...	....	....	....	....	....
...	....	....	....	....	....
2	B	37.5382	4952.03	− 9	4951.94
1	n D	37.4760	4954.30	−10	4954.20
2	n D	37.3805	4957.81	−11	4957.70
End	....	36.8590	4977.2	−19	4977.0

PLATE G 394

Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length
		mm.	t.m.		t.m.
1	n D	43.1853	4862.43	+ 4	4862.47
1	n D	43.1040	4865.16	+ 3	4865.19
1	nn D	43.0128	4868.23	+ 3	4868.26
...	....	....	....	....	....
4	D	42.9122	4871.63	+ 3	4871.66
...	....	....	....	....	....
1	D	42.7174	4878.25	+ 2	4878.27
...	....	....	....	....	....
4	w D	42.6121	4881.84	+ 2	4881.86
3	B	42.5533	4883.86	+ 2	4883.88
...	....	....	....	....	....
6	w D	42.4864	4886.16	+ 1	4886.17
...	....	....	....	....	....
2	B	42.4250	4888.27	+ 1	4888.28
...	....	....	....	....	....
B	from	42.3120	4892.18	+ 1	4892.19
	....	....	....	....	....
	....	....	....	....	....
	to	42.0790	4900.28	0	4900.28
3	D	42.0420	4901.56	0	4901.56
...	....	....	....	....	....
4	w B	41.9713	4904.04	− 1	4904.03
...	....	....	....	....	....
3	w D	41.8992	4906.57	− 1	4906.56
...	....	....	....	....	....
4	w D	41.7683	4911.18	− 2	4911.16
...	....	....	....	....	....
1-2	n D	41.3203	4927.13	− 4	4927.09
1-2	n B	41.2587	4929.34	− 5	4929.29
...	....	....	....	....	....
...	....	....	....	....	....
1	n D	40.8027	4945.89	− 7	4945.82
...	....	....	....	....	....
...	....	....	....	....	....
...	....	....	....	....	....
...	....	....	....	....	....
2	n D	40.5741	4954.30	− 9	4954.21
...	....	....	....	....	....
End	....	39.9740	4976.8	−13	4976.7

152 *SCHJELLERUP—Continued*

Plate A 313						Plate A 319						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Formula	Cor. from Curve	Wave-Length	Uncorrected for Velocity	Cor. for V	Corrected for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
...	nn D	65.0867	4861.79	+36	4862.15	...	....	....	....	....	....	62.31	−2	4862.29
...	nn D	65.2159	4864.55	+35	4864.90	...	....	....	....	....	....	65.11	−2	4865.09
...	nn D	65.3530	4867.48	+35	4867.83	...	nn D	63.4397	4867.23	+57	4867.80	67.96	−2	4867.94
...	....	....	....	....	....	3	n B	63.4955	4868.42	+57	4868.99	68.99	−2	4868.97
3	wn D	65.5204	4871.07	+34	4871.41	...	nn D	63.5905	4870.46	+57	4871.03	71.34	−2	4871.32
2	n D	65.7120	4875.20	+34	4875.54	...	nn D	63.7809	4874.57	+56	4875.13	75.35	−2	4875.33
...	nn D	65.8364	4877.89	+33	4878.22	...	....	....	....	....	....	78.34	−2	4878.32
1–2	n B	65.9035	4879.35	+33	4879.68	4	n B	63.9845	4878.97	+56	4879.53	79.63	−2	4879.61
5–6	n D	65.9855	4881.13	+33	4881.46	7	D	64.0649	4880.72	+55	4881.27	81.54	−2	4881.52
2–3	n B	66.0672	4882.91	+33	4883.24	5	n B	64.1542	4882.66	+55	4883.21	83.51	−2	4883.49
	from	66.1160	4884.20	+32	4884.52	...	....	....	....	....	....	84.52	−2	4884.5
D	....	....	....	....	....	3–4	D	64.2942	4885.28	+54	4885.82	85.97	−2	4885.95
	to	66.2525	4886.95	+32	4887.27	...	....	....	....	....	....	87.27	−2	4887.3
2–3	n B	66.2853	4887.67	+32	4887.99	4	n B	64.3655	4887.27	+54	4887.81	88.06	−2	4888.04
...	nn D	66.3480	4889.00	+32	4889.32	1	n D	64.5034	4890.30	+53	4890.83	90.1	−2	4890.1
Gen.	from	66.4660	4891.60	+32	4891.92	...	....	....	....	....	....	92.06	−2	4892.0
...	....	....	....	....	....	...	....	....	....	....	....	93.73	−2	4893.71
Spec.	to	66.6240	4895.10	+31	4895.41	...	....	....	....	....	....	95.41	−2	4895.4
3–4	n B	66.7787	4898.53	+31	4898.84	4	B	64.8534	4898.02	+51	4898.53	98.72	−2	4898.70
...	....	....	....	....	....	...	....	....	....	....	....	00.28	−2	4900.3
...	wn D	66.8780	4900.73	+31	4901.04	3	n D	64.9767	4900.75	+50	4901.25	01.20	−2	4901.18
	from	66.9325	4901.95	+30	4902.25	...	....	....	....	....	....	02.25	−2	4902.2
B	....	....	....	....	....	5	n B	65.0814	4903.08	+49	4903.57	03.80	−2	4903.78
	to	67.0510	4904.58	+30	4904.88	...	....	....	....	....	....	04.88	−2	4904.9
...	wn D	67.1070	4905.83	+30	4906.13	...	....	....	....	....	....	06.43	−2	4906.41
3	n B	67.2142	4908.23	+29	4908.52	3–4	B	65.2967	4907.89	+47	4908.36	08.44	−2	4908.42
3	n D	67.3092	4910.36	+29	4910.65	...	nn D	65.3838	4909.84	+47	4910.31	10.61	−2	4910.59
...	....	....	....	....	....	...	....	....	....	....	....	20.56	−2	4920.54
...	....	....	....	....	....	...	wnD	66.1150	4926.39	+40	4926.79	26.94	−2	4926.92
2	n B	68.1255	4928.85	+26	4929.11	...	n B	66.2062	4928.47	+39	4928.86	29.09	−2	4929.07
...	nn D	68.1936	4930.43	+26	4930.69	2	n D	66.3024	4930.67	+38	4931.05	30.87	−2	4930.85
...	....	....	....	....	....	...	....	....	....	....	....	43.86	−2	4943.84
...	nn D	68.8315	4945.13	+23	4945.36	2	n D	66.9292	4945.16	+32	4945.48	45.62	−2	4945.60
...	....	....	....	....	....	...	....	....	....	....	....	47.83	−2	4947.81
...	....	....	....	....	....	2	n D	67.0518	4948.02	+31	4948.33	48.39	−2	4948.37
...	nn D	69.0174	4949.47	+22	4949.69	3	n D	67.1088	4949.32	+30	4949.62	49.66	−2	4949.64
...	....	....	....	....	....	...	B	67.2065	4951.63	+29	4951.82	51.88	−2	4951.86
...	nn D	69.1897	4953.50	+21	4953.71	1	n D	67.2804	4953.37	+28	4953.65	53.94	−2	4953.92
...	....	....	....	....	....	...	....	....	....	....	....	57.70	−2	4957.68
End	....	70.1385	4976.03	+16	4976.19	End	....	68.2360	4976.10	+16	4976.3	.....	...	....

152 SCHJELLERUP

Plate G 275 1899, January 14, G.M.T. 22h2 Hour angle, E 0h8 Star excellent; comparison good						Plate G 291 1899, January 26, G.M.T. 20h8 Star good; comparison good						Plate G 302 1899, March 6, G.M.T. 22h8 Hour angle, W 3h3 Star excellent; comparison good						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Form.	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Form.	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Form.	Cor. from Curve	Wave-Length	Uncor. for Velocity	Cor. for V	Cor. for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
Head	....	46.8420	5167.90	+20	5168.10							Head	....	50.7600	5167.50	+16	5167.66	67.88	−2	5167.86
1	B?	46.8254	5168.55	+23	5168.78							....	....	....	....	....	....	68.72	−2	5168.70
1	D	46.8024	5169.44	+22	5169.66							1	n D	50.7104	5169.45	+15	5169.60	69.63	−2	5169.61
2	B?	46.7745	5170.53	+22	5170.75							3	B	50.6802	5170.63	+15	5170.78	70.77	−2	5170.75
5	n D	46.7061	5173.21	+22	5173.43							8	D	50.6197	5173.00	+15	5173.15	73.29	−2	5173.27
....	....	....	....	....	....							2	B?	50.5625	5175.25	+14	5175.39	75.45	−2	5175.43
....	....	....	....	....	....							1	B?	50.4771	5178.61	+13	5178.74	78.76	−2	5178.74
5-6	n D	46.4331	5183.96	+20	5184.16							8	n D	50.3440	5183.91	+12	5184.03	84.10	−2	5184.08
6	B	46.3520	5187.18	+19	5187.37							7	B	50.2584	5187.28	+11	5187.39	87.38	−2	5187.36
1-2	n D	46.3078	5188.93	+19	5189.12							2	D	50.2160	5188.98	+11	5189.09	89.11	−2	5189.09
7	B	46.2593	5190.87	+19	5191.06							7	B	50.1702	5190.80	+11	5190.91	90.99	−2	5190.97
6	D	46.2008	5193.20	+18	5193.38							6	D	50.1114	5193.15	+10	5193.25	93.32	−2	5193.30
1	D	45.9762	5202.21	+17	5202.38							1	nn D	49.8804	5202.44	+7	5202.51	02.45	−2	5202.43
2	B	45.9375	5203.77	+16	5203.93							1-2	B	49.8480	5203.74	+7	5203.81	03.87	−2	5203.85
2-3	n D	45.8877	5205.78	+16	5205.94							....	....	....	....	....	....	05.88	−2	5205.86
2	B	45.6743	5214.44	+14	5214.58							5	B	49.5894	5214.24	+3	5214.27	14.43	−2	5214.41
5	n D	45.6144	5216.88	+14	5217.02							4	n D	49.5300	5216.66	+3	5216.69	16.86	−2	5216.84
2-3	wn B	45.5598	5219.11	+12	5219.23							4	B	49.4726	5219.02	+2	5219.04	19.14	−2	5219.12
5	wn D	45.3686	5226.96	+10	5227.06							5	D	49.2796	5226.95	−1	5226.94	27.00	−2	5226.98
4	B	45.2891	5230.12	+9	5230.21							6	B	49.1986	5230.31	−2	5230.29	30.25	−2	5230.23
4	D	45.2109	5233.48	+8	5233.56							5	D	49.1245	5233.38	−3	5233.35	33.46	−2	5233.44
9	B	45.1470	5236.13	+7	5236.20							10	B	49.0537	5236.32	−4	5236.28	36.24	−2	5236.22
....	....	....	....	....	....							1-2	n D	48.9896	5238.99	−5	5238.94	39.00	−2	5238.98
1-2	n B	44.9386	5244.83	+2	5244.85							3	B	48.8455	5245.02	−9	5244.93	44.89	−2	5244.87
5	D	44.8799	5247.29	+1	5247.30							6	D	48.7921	5247.26	−10	5247.16	47.23	−2	5247.21
4	B	44.8316	5249.32	+1	5249.33							5	B	48.7448	5249.25	−11	5249.14	49.24	−2	5249.22
8	D	44.7830	5251.36	0	5251.36							7	D	48.6936	5251.41	−12	5251.29	51.33	−2	5251.31
1	n D	44.6881	5255.37	−1	5255.36							2	D	48.5985	5255.43	−14	5255.29	55.33	−2	5255.31
1	nn D	44.4336	5266.19	−4	5266.15							1	D	48.3382	5266.51	−18	5266.33	66.24	−2	5266.22
4	D	44.3407	5270.16	−5	5270.11							5	D	48.2514	5270.23	−20	5270.03	70.07	−2	5270.05
....	....	....	....	....	....							2	n B	48.1945	5272.67	−21	5272.46	72.52	−2	5272.50
....	....	....	....	....	....							2	n B	48.0329	5279.65	−22	5279.43	79.49	−2	5279.47
1	nn D?	44.0833	5281.25	−7	5281.18							....	....	....	....	....	....	81.12	−2	5281.10
1	n D	44.0056	5284.62	−8	5284.54							1-2	n D	47.9213	5284.49	−23	5284.26	84.35	−2	5284.33
....	....	....	....	....	....							1	n D?	47.6986	5294.21	−24	5293.97	94.03	−2	5294.01
....	....	....	....	....	....							2	n D	47.6214	5297.60	−24	5297.36	97.42	−2	5297.40
1	B?	43.5692	5303.73	−10	5303.63							2	B?	47.4755	5304.04	−23	5303.81	03.72	−2	5303.70
4	B	43.3509	5313.41	−10	5313.31							4	B	47.2656	5313.35	−22	5313.13	13.22	−2	5313.20
3	D	43.3021	5315.59	−10	5315.49							3	n D	47.2163	5315.56	−22	5315.34	15.42	−2	5315.40
....	....	....	....	....	....							1-2	B	47.1719	5317.54	−22	5317.32	17.38	−2	5317.36
....	....	....	....	....	....							1	D	46.9975	5325.37	−20	5325.17	25.23	−2	5325.21
2	n D	43.0076	5328.81	−8	5328.73							3	D	46.9263	5328.58	−19	5328.39	28.56	−2	5328.54
4	B	42.8610	5335.45	−7	5335.38							3	B	46.7763	5335.38	−18	5335.20	35.27	−2	5335.25
1	n D	42.8149	5337.54	−6	5337.48							1-2	n D	46.7338	5337.32	−17	5337.15	37.32	−2	5337.30
6	B	42.7732	5339.44	−6	5339.38							7	B	46.6864	5339.47	−16	5339.31	39.35	−2	5339.33
4-5	D	42.7259	5341.60	−5	5341.55							7	D	46.6339	5341.87	−16	5341.71	41.63	−2	5341.61
5-6	B	42.6648	5344.39	−4	5344.35							6	B	46.5774	5344.46	−15	5344.31	44.33	−2	5344.31
3	n B	42.4884	5352.50	−2	5352.48							3-4	B	46.4091	5352.19	−13	5352.06	52.27	−2	5352.25
1	nn D	42.2715	5362.54	+1	5262.55							1	n D	46.1844	5362.60	−12	5362.48	62.52	−2	5362.50
1-2	n B?	42.2295	5364.49	+2	5364.51							1-2	B?	46.1480	5364.29	−11	5364.18	64.35	−2	5364.33
3	n D	42.1837	5366.63	+2	5366.65							3-4	D	46.0929	5366.87	−9	5366.78	66.72	−2	5366.70
8	B	42.1300	5369.14	+3	5369.17							10	B	46.0439	5369.16	−8	5369.08	69.13	−2	5369.11
7	D	42.0667	5372.10	+4	5372.14							9	D	45.9796	5372.17	−7	5372.10	72.12	−2	5372.10
6	B	42.0040	5375.04	+5	5375.09							8	B	45.9200	5374.96	−6	5374.90	75.00	−2	5374.98
3	D	41.9612	5377.06	+6	5377.12							4	D	45.8744	5377.11	−6	5377.05	77.09	−2	5377.07
3	B	41.9218	5378.92	+6	5378.98							2-3	B	45.8356	5378.94	−5	5378.89	78.94	−2	5378.92
3	B	41.8679	5381.46	+7	5381.53							2-3	B	45.7828	5381.44	−5	5381.39	81.46	−2	5381.44
D {	from	41.8390	5382.90	+8	5382.98							....	....	....	....	....	....	82.92	−2	5382.9
	to	41.5560	5396.30	+10	5396.40							....	....	....	....	....	....	96.34	−2	5396.3
3	D	41.5236	5397.85	+11	5397.96							2-3	n D	45.4383	5397.84	0	5397.84	97.90	−2	5397.88
2-3	n D	41.3140	5407.94	+13	5408.07							....	nn D	45.2160	5408.54	+2	5408.56	08.32	−2	5408.30
1	n D	41.1879	5414.05	+14	5414.19							1-2	n D	45.1047	5413.94	+3	5413.97	14.08	−2	5414.06
1-2	nn D	41.0663	5419.98	+15	5420.13							2	n D	44.9777	5420.13	+4	5420.17	20.15	−2	5420.13
1-2	B	41.0138	5422.54	+15	5422.69							3	n B	44.9336	5422.29	+5	5422.34	22.52	−2	5422.50
1	n D	40.9760	5424.39	+15	5424.54							1	n D	44.8934	5424.26	+5	5424.31	24.43	−2	5424.41
1	n D	40.8617	5430.01	+16	5430.17							2	D	44.7707	5430.29	+6	5430.35	30.26	−2	5430.24
....	....	....	....	....	....							2	B	44.7333	5432.13	+6	5432.19	32.25	−2	5432.23
1-2	n D	40.7759	5434.25	+16	5434.41							1	n D	44.6900	5434.27	+6	5434.33	34.37	−2	5434.35
....	....	....	....	....	....							2	D	44.5980	5438.82	+7	5438.89	38.95	−2	5438.93
2	n B	40.6067	5442.64	+17	5442.81							2	B	44.5230	5442.55	+7	5442.63	42.72	−2	5442.70
....	wn D	40.5144	5447.22	+17	5447.39							....	w D	44.4410	5446.69	+8	5446.77	47.08	−2	5447.06
2	B	40.4418	5450.87	+17	5451.04							4	B	44.3595	5450.72	+8	5450.80	50.92	−2	5450.90
1	nn D	40.3180	5457.09	+16	5457.25							1	nn D	44.2350	5456.97	+8	5457.05	57.15	−2	5457.13
1	nn D	40.2370	5461.17	+16	5461.33							1	nn D	44.1556	5460.98	+9	5461.07	61.20	−2	5461.18
1	D	39.9809	5474.20	+15	5474.35							1	nn D	43.8940	5474.28	+10	5474.38	74.37	−2	5474.35
0-1	n B	39.8384	5481.51	+14	5481.65							1	B	43.7538	5481.46	+10	5481.56	81.60	−2	5481.58
1	B	39.7378	5486.69	+14	5486.83							1	B	43.6429	5487.17	+10	5487.27	87.05	−2	5487.03
4	B	39.3232	5508.29	+10	5508.39							5-6	B	43.2402	5508.14	+10	5508.24	08.32	−2	5508.30
1-2	n B	39.1571	5517.05	+8	5517.13							....	....	....	....	....	....	....	....	....
1	nn D	38.8556	5533.11	+4	5533.15							1-2	nn D	42.7908	5531.97	+10	5532.07	32.61	−2	5532.59
....	wn D	38.7397	5539.34	+3	5539.37							2-3	n D	42.6563	5539.19	+10	5539.29	39.33	−2	5539.31
1-2	n D	38.6052	5546.61	+1	5546.62							....	wn D	42.5199	5546.55	+9	5546.54	46.58	−2	5546.56
1	D	38.4922	5552.80	0	5552.80							1	D	42.4118	5552.42	+9	5552.51	52.66	−2	5552.64
....	....	....	....	....	....							1	n D	42.3428	5556.18	+8	5556.26	56.26	−2	5556.24
....	....	....	....	....	....							1	n D	42.2285	5562.44	+8	5562.52	62.52	−2	5562.50

152 *SCHJELLERUP—Continued*

Plate G 275						Plate G 291						Plate G 302						Mean Wave-Length		
Intensity	Character	Mean Scale Reading	Wave-Length by Form.	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Form.	Cor. from Curve	Wave-Length	Intensity	Character	Mean Scale Reading	Wave-Length by Form.	Cor. from Curve	Wave-Length	Uncor. for Velocity	Cor. for V	Cor. for Velocity
		mm.	t.m.		t.m.			mm.	t.m.		t.m.			mm.	t.m.		t.m.	t.m.		t.m.
4	n D	38.2116	5568.13	− 3	5568.10													68.10	−2	5568.08
8	w D	38.0700	5575.96	− 4	5575.92							6	nn D	41.9758	5576.37	+ 6	5576.43	76.18	−2	5576.16
8	w D	37.9289	5583.81	− 6	5583.75							10	wn D	41.8455	5583.61	+ 6	5583.67	83.71	−2	5583.69
1	B	37.8593	5587.70	− 7	5587.63							1	n B	41.7761	5587.49	+ 5	5587.54	87.59	−2	5587.57
1	D	37.8356	5589.03	− 7	5588.96	1	n D	37.9875	5589.12	−13	5588.99	1	nn D	41.7509	5588.90	+ 5	5588.95	88.97	−2	5588.95
8	B	37.7906	5591.55	− 7	5591.48							10	n B	41.7067	5591.38	+ 5	5591.43	91.46	−2	5591.44
						2	B	37.9233	5592.73	−13	5592.60							92.60	−2	5592.58
D	from	37.4960	5607.97	− 9	5607.88							D	from	41.4500	5605.85	+ 3	5605.88	06.9	−2	5606.9
1	D	37.3566	5616.17	−10	5616.07													16.07	−2	5616.0
D	from	37.3080	5618.94	−10	5618.84													18.84	−2	5618.8
	to	37.1840	5626.08	−10	5625.98								to	41.1180	5624.83	− 1	5624.82	25.45	−2	5625.4
	w B	37.1274	5629.36	−12	5629.24								w B	41.0492	5628.81	− 1	5628.80	29.02	−2	5629.00
10	w D	37.0485	5633.93	−12	5633.81	10	w D	37.1949	5634.44	−20	5634.24	10	D	40.9713	5633.31	− 2	5633.29	33.78	−2	5633.76
	Head	37.0060	5636.40	−12	5636.28								Head	40.9250	5636.00	− 2	5635.98	36.13	−2	5636.11
						5	B	37.1215	5638.71	−20	5638.51	6	B	40.8964	5637.66	− 2	5637.64	38.08	−2	5638.06
						1	D	37.0958	5640.22	−21	5640.01							40.01	−2	5639.99
						4	B	37.0675	5641.87	−21	5641.66	2–3	B	40.8335	5641.32	− 3	5641.29	41.48	−2	5641.46
						2	D	37.0106	5645.20	−20	5645.00	1	n D	40.7841	5644.21	− 4	5644.17	44.59	−2	5644.57
													from	40.7460	5646.43	− 4	5646.39	46.39	−2	5646.37
						0–1	D	36.9105	5651.09	−22	5650.87							50.87	−2	5650.85
						1–2	D?	36.8551	5654.36	−22	5654.14							54.14	−2	5654.12
						0–1	D	36.8010	5657.56	−22	5657.34	B						57.34	−2	5657.32
1	D?	36.5624	5662.47	−14	5662.33	1	D?	36.7140	5662.72	−22	5662.50							62.41	−2	5662.39
						Max	B	36.5999	5669.52	−22	5669.30							69.30	−2	5669.28
													to	40.3430	5670.24	− 7	5670.17	70.17	−2	5670.2
												1	nn D	40.3250	5671.31	− 7	5671.24	71.24	−2	5671.22
1	D	36.3416	5675.64	−15	5675.49	2	D	36.4922	5675.97	−23	5675.74	2	nn D	40.2586	5675.28	− 7	5675.21	75.48	−2	5675.46
						2	B	36.4297	5679.73	−23	5679.50							79.51	−2	5679.49
2	D	36.1554	5686.85	−15	5686.70	4	D	36.3047	5687.28	−23	5687.05	4	D	40.0777	5686.15	− 8	5686.07	86.61	−2	5686.59
						3	n B	36.1968	5693.83	−24	5693.59	5	B	39.9667	5692.87	− 9	5692.78	93.19	−2	5693.17
						1	n D	36.1509	5696.62	−25	5696.37		D	39.9258	5695.35	− 9	5695.26	95.82	−2	5695.80
												1–2	B	39.7661	5705.09	−10	5704.99	04.99	−2	5704.97
1–2	D	35.8047	5708.23	−16	5708.07	2	n D	35.9556	5708.58	−26	5708.32	1	D	39.7275	5707.45	−10	5707.35	07.91	−2	5707.89
2	B	35.7656	5710.63	−16	5710.47													10.47	−2	5710.45
	nn D	35.7232	5713.25	−16	5713.09	1	n D	35.8881	5712.74	−26	5712.48	1	n D	39.6521	5712.08	−11	5711.97	12.51	−2	5712.49
8	B	35.6632	5716.95	−16	5716.79	6	n B	35.8220	5716.83	−27	5716.56	7	w B	39.5838	5716.29	−11	5716.18	16.51	−2	5716.49
						4	n D	35.7505	5721.26	−27	5720.99	1	n D	39.5185	5720.32	−12	5720.20	20.70	−2	5720.68
						1	B	35.7057	5724.05	−27	5723.78	6	B	39.4621	5723.82	−12	5723.70	23.82	−2	5723.80
						6	w D	35.5739	5732.28	−27	5732.01	4	n D	39.3460	5730.97	−12	5730.87	31.62	−2	5731.60
B	from	35.3850	5734.30	−16	5734.14							B	from	39.3000	5733.91	−12	5733.79	33.97	−2	5733.9
	to	35.2600	5742.11	−16	5741.95								to	39.1910	5740.74	−13	5740.61	41.28	−2	5741.3
1	D?	35.2315	5743.92	−16	5743.76							2	D?	39.1564	5742.92	−13	5742.79	43.28	−2	5743.26
1–2	B	35.1883	5746.65	−16	5746.49							2	B	39.1109	5745.79	−13	5745.66	46.08	−2	5746.06
2	n D	35.1414	5749.62	−16	5749.46							3	D	39.0655	5748.66	−13	5748.53	49.00	−2	5748.98
1	n B?	35.0839	5753.27	−16	5753.11							1	n B?	39.0106	5752.13	−14	5751.99	52.55	−2	5752.53
2	n B	35.0224	5757.18	−16	5757.02							1	n B	38.9501	5755.97	−14	5755.83	56.43	−2	5756.41
1	n D?	34.9860	5759.50	−16	5759.34													59.34	−2	5759.32
1–2	n B	34.8645	5767.28	−17	5767.11													67.11	−2	5767.09
2	n D	34.8079	5770.92	−16	5770.76							2	D	38.7363	5769.62	−14	5769.48	70.12	−2	5770.10
3	B	34.7599	5774.02	−17	5773.85							1–2	B	38.6838	5773.00	−15	5772.85	73.35	−2	5773.33
4	B	34.6569	5780.68	−17	5780.51							2	B	38.5768	5779.90	−15	5779.75	80.13	−2	5780.11
4	D	34.5916	5784.92	−17	5784.75							5	w D	38.5189	5783.65	−15	5783.50	84.13	−2	5784.11
2	B?	34.5383	5788.39	−17	5788.22													88.22	−2	5788.20
1	D	34.5060	5790.50	−17	5790.33							1	n D	38.4319	5788.65	−15	5788.50	89.42	−2	5789.40
												1	n D	38.3064	5797.50	−16	5797.34	97.34	−2	5797.32
												2–3	B?	38.2670	5800.08	−16	5799.92	00.32	−2	5800.30
3	B?	34.3474	5800.90	−17	5800.73							2–3	D?	38.2246	5802.86	−16	5802.70	02.70	−2	5802.68
	B?	34.1176	5816.11	−16	5815.95													15.95	−2	5815.93
												1	D?	38.0135	5816.82	−16	5816.66	16.66	−2	5816.64
												1	D	37.9316	5822.27	−16	5822.11	22.11	−2	5822.09
	B?	33.9529	5827.11	−16	5826.95													26.95	−2	5826.93
	B?	33.8034	5837.17	−16	5837.01													37.01	−2	5836.99
												1	D?	37.3934	5858.62	−16	5858.46	58.46	−2	5858.44
												1	D?	37.1202	5877.43	−16	5877.27	77.27	−2	5877.25
	D?	33.1089	5884.89	−16	5884.73													84.73	−2	5884.71
	End	33.1250	5883.8	−16	5883.6													83.6	−2	5883.6
													End	36.9760	5887.4	−16	5887.2	87.2	−2	5887.2

DETERMINATION OF THE RADIAL VELOCITIES

The determination of the radial velocities was complicated by the presence of bright lines in the spectra, since the apparent center of a neighboring dark line would be shifted by an amount which would vary with the exposure and consequent density of the negative. To avoid this difficulty as far as possible, dark lines away from bright lines were selected for velocity determinations whenever they were available. The following tables give in detail for each star the lines selected, the elements with which they were identified, the differences in wave-length, and the resulting velocity corrections. The great range for the different lines is partly due to the cause just mentioned, but errors also necessarily arise from the use of lines which blend together in the spectra of these stars, though they are well separated in the solar spectrum. Such blends result from the large slit-widths used with comparatively small dispersion, the increased strength of lines in fourth-type spectra, and the changes of relative intensity as compared with the solar spectrum.

RADIAL VELOCITIES FROM THE DARK LINES

The tables are arranged as follows: The third column, headed Δλ, gives the displacement of the lines in hundredths of a tenth-meter; the fourth column gives the velocity corresponding to a displacement of one tenth-meter; the fifth column gives the deduced velocity, being the product of columns three and four.

19 *PISCIUM*

Star	Element	Δλ	V_1	V
t.m.	t.m.		km.	km.
4404.95	*Fe* 04.94	+1	68	+1
4408.48	*Fe* 08.60	−12	68	−8
4415.14	*Fe* 15.33	−19	68	−13
4489.72	*Fe* 89.90	−18	67	−12
4496.99	*Cr* 97.02	−3	67	−2
4512.73	*Ti* 12.91	−18	66	−12
4518.24	*Ti* 18.18	+6	66	+4
4522.97	*Ti* 22.97	0	66	0
4594.31	*V* 94.27	+4	66	+3
4789.40	*Fe* 89.40 du	0	63	0
5247.53	*Fe* 47.27	+26	57	+15
5397.54	*Fe* 97.70 tr	−26	56	−14
5406.39	*Fe* 05.98	+41	55	+22
5430.35	*Fe* 29.81	+54	55	+30
5731.16	*Fe* 31.98	−82	52	−43

16 lines, Mean −2 km.

318 *BIRMINGHAM*

Star	Element	Δλ	V_1	V
t.m.	t.m.		km.	km.
4405.00	*Fe* 04.94	+6	68	+4
4414.96	*Fe* 15.33	−37	68	−25
4496.82	*Cr* 97.02	−20	67	−13
4512.49	*Ti* 12.88	−39	66	−26
4518.16	*Ti* 18.18	−2	66	−1
4522.91	*Ti* 22.97	−6	66	−4
4531.18	*Fe* 31.31	−13	66	−9
4920.62	*Fe* 20.69	−7	61	−4
4934.31	*Ba* 34.24	+7	61	+4
5173.46	*Ti* 73.94	−48	58	−28
5193.26	*Ti* 93.15	+11	58	+6
5251.10	*Ti* 50.83	+27	57	+16
5255.42	*Ti* 55.15	+27	57	+16
5269.84	*Ti* 69.72	+12	57	+7
5297.59	*Cr* 98.15	−56	57	−32
5328.52	*Fe* 28.38	+14	56	+8
5396.93	*Fe* 97.32	−39	56	−22
5410.19	*Fe* 10.53	−34	55	−19

19 lines, Mean −8 km.

280 *SCHJELLERUP*

Star	Element	Δλ	V_1	V
t.m.	t.m.		km.	km.
4434.85	*Fe* 35.33	−47	68	−32
4512.45	*Ti* 12.88	−43	66	−28
4517.77	*Ti* 18.18	−41	66	−27
4522.53	*Ti* 22.97	−44	66	−29
4605.88	*Fe* 06.40	−52	65	−34
4645.67	*Fe* 46.40	−73	64	−47
4667.76	*Fe* 67.96	−20	64	−13
4681.77	*Fe* 82.24	−47	64	−30
4714.10	*Ni* 14.59	−49	64	−31
4728.22	*Fe* 28.73	−51	63	−32
5297.72	*Cr* 98.15	−43	57	−25
5349.99	*Fe* 49.89	+10	56	+6
5371.62	*Fe* 71.68	−6	56	−3
5397.02	*Fe* 97.32	−30	56	−17
5405.81	*Fe* 05.97	−16	55	−9
5410.10	*Fe* 10.52	−42	55	−23

16 lines, Mean −25 km.

74 *SCHJELLERUP*

Star	Element	Δλ	V_1	V
t.m.	t.m.		km.	km.
4395.13	*Ti* 95.19	−6	68	−4
4415.38	*Fe* 15.33	+5	68	+3
4497.29	*Cr* 97.02	+27	67	+18
4512.43	*Ti* 12.88	−45	66	−30
4518.46	*Ti* 18.18	+28	66	+18
4523.23	*Ti* 22.97	+31	66	+20
4527.45	*Ti* 27.48	−3	66	−2
4565.82	*Fe* 65.87	−5	66	−3
4789.34	*Fe* 89.37	−3	63	−2
4832.65	*Fe* 32.90	−25	62	−15
5173.31	*Mg* 72.86	+45	58	+26
5251.76	*Fe* 51.49	+27	57	+15
5270.17	*Fe* 70.11	+8	57	+5

13 lines, Mean +4 km.

78 *SCHJELLERUP*

Star	Element	Δλ	V_1	V
t.m.	t.m.		km.	km.
4415.17	*Fe* 15.33	−16	68	−11
4455.50	*Ti* 55.48	+2	67	+1
4496.95	*Cr* 97.02	−7	67	−5
4512.92	*Ti* 12.88	+4	66	+3
4518.19	*Ti* 18.18	+1	66	+1
4523.02	*Ti* 22.97	+5	66	+3
4527.27	{ *Ca* 27.10 *Ti* 27.49	−3	66	−2
4784.52	*V* 84.65	−13	63	−8
5183.92	*Mg* 83.79	+15	58	+9
5189.15	*Ca* 89.05	+10	58	+6
5233.95	*V* 33.91	+4	57	+2
5349.55	*Ca* 49.65	−10	56	−6
5731.46	*V* 31.48	−2	52	−1

13 lines, Mean −1 km.

115 *SCHJELLERUP*

Star	Element	Δλ	V_1	V
t.m.	t.m.		km.	km.
4435.28	*Fe* 35.33	−5	68	−3
4496.84	*Cr* 97.02	−18	67	−12
4512.85	*Ti* 12.88	−3	66	−2
4518.01	*Ti* 18.18	−17	66	−11
4522.88	*Ti* 22.97	−9	66	−6
4553.89	*Ba* 54.21	−32	66	−21
5183.38	*Mg* 83.79	−41	58	−24
5731.72	*Fe* 31.98	−26	52	−14

8 lines, Mean −12 km.

132 *SCHJELLERUP*

Star	Element	Δλ	V_1	V
t.m.	t.m.		km.	km.
4397.83	*V* 98.35	−35	68	−24
4404.52	*Fe* 04.94	−42	68	−29
4408.25	*Fe* 08.60	−35	68	−24
4414.66	*Fe* 15.33	−67	68	−46
4454.53	*Ca* 54.95	−42	67	−28
4489.46	*Fe* 89.90	−44	67	−29
4496.44	*Cr* 97.02	−58	67	−39
4512.35	*Ti* 12.88	−53	66	−36
4517.67	*Ti* 18.18	−51	66	−34
4522.57	*Ti* 22.97	−40	66	−26
4528.27	*Fe* 28.84	−57	66	−38
4552.42	*Fe* 52.72	−30	66	−20
4593.67	*V* 94.27	−60	65	−39
4656.03	*Ti* 56.64	−61	64	−39
4924.13	*Fe* 24.39	−26	61	−16
4933.02	*Fe* 33.50	−48	61	−29
5172.36	*Mg* 72.86	−50	58	−29
5246.92	*Fe* 47.27	−35	57	−19
5297.61	*Cr* 98.15	−54	57	−31
5328.56	*Fe* 28.71	−15	56	−9
5397.47	*Fe* 97.70	−23	56	−13

21 lines, Mean −28 km.

152 *SCHJELLERUP*

Star	Element	Δλ	V_1	V
t.m.	t.m.		km.	km.
4489.63	*Fe* 89.90	−27	67	−18
4512.83	*Ti* 12.88	−5	66	−3
4518.25	*Ti* 18.18	+7	66	+5
4552.67	*Fe* 52.72	+5	66	+3
4593.95	*V* 94.27	−32	65	−22
4789.68	*Fe* 89.80	−12	63	−8

6 lines, Mean, wt. 2, −9 km.

5173.29	*Mg* 72.86	+43	58	+25
5202.45	*Fe* 02.49	−4	58	−2
5247.23	*Fe* 47.27	−4	57	−2
5270.07	*Fe* 69.99	+8	57	+5
5328.56	*Fe* 28.71	−15	56	−8
5430.26	*Fe* 29.81	+45	55	+25
5686.61	*Fe* 86.66	−5	53	−3

7 lines, Mean, wt. 1, +6
Weighted mean, −4 km.

RADIAL VELOCITIES FROM THE BRIGHT LINES

Comparison with 132 *Schjellerup*

As a check on these very unsatisfactory results, the bright lines of the other stars were compared with the bright lines of 132 *Schjellerup*. The following table gives this comparison, with the velocities resulting from the use of the value −28 km., adopted for 132 *Schjellerup*.

RADIAL VELOCITIES FROM THE BRIGHT LINES

132 *Schj.*	19 *Pisc.*		318 *Birm.*		74 *Schj.*		78 *Schj.*		115 *Schj.*		152 *Schj.*	
	λ	Δλ	λ	Δλ	λ	Δλ	λ	Δλ	λ	Δλ	λ	Δλ
t.m.	t.m.		t.m.		t.m.		t.m.		t.m.		t.m.	
4402.03	.....	....	02.32	+29	02.68	+65	.....	....	.....	....	.....	....
4437.05	.....	....	37.21	+16	.....	....	.....	....	.....	....	.....	....
4438.45	38.86	+41	38.95	+50	.....	....	.....	....	.....	....	.....	....
4448.24	.....	....	48.46	+24	48.95	+71	.....	....	.....	....	.....	....
4463.65	64.01	+36	.....	....	.....	....	.....	....	.....	....	64.23	+58
4488.29	88.58	+29	.....	....	.....	....	.....	....	.....	....	88.92	+63
4521.23	.....	....	21.52	+29	.....	....	.....	....	.....	....	.....	....
4524.26	.....	....	.....	....	.....	....	.....	....	.....	....	24.69	+43
4536.55	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....
4537.06	.....	....	37.23	+42	.....	....	.....	....	36.98	+17	.....	....
4538.57	38.97	+40	38.74	+17	.....	....	.....	....	.....	....	39.24	+67
4547.19	47.76	+57	.....	....	.....	....	47.73	+52	47.61	+42	47.78	+59
4578.09	.....	....	.....	....	.....	....	.....	....	.....	....	78.64	+55
4579.26	.....	....	.....	....	.....	....	.....	....	.....	....	79.75	+49
4580.77	.....	....	.....	....	.....	....	.....	....	.....	....	81.27	+50
4583.49	83.64	+15	.....	....	.....	....	.....	....	.....	....	83.94	+45
4585.07	85.38	+31	.....	....	.....	....	.....	....	.....	....	.....	....
4614.73	.....	....	15.00	+27	.....	....	.....	....	.....	....	.....	....
4617.78	.....	....	.....	....	18.07	+29	18.07	+29	.....	....	18.21	+43
4621.09	21.32	+23	21.41	+32	21.66	+57	21.49	+40	.....	....	.....	....
4638.57	38.72	+15	39.04	+47	39.11	+54	39.13	+56	.....	....	38.88	+31
4641.47	41.71	+24	.....	....	.....	....	42.08	+61	.....	....	.....	....
4664.82	65.38	+56	.....	....	.....	....	.....	....	.....	....	.....	....
4738.39	.....	....	38.63	+24	.....	....	38.93	+54	38.72	+33	.....	....
4829.86	.....	....	30.30	+44	.....	....	.....	....	.....	....	30.59	+73
5312.93	.....	....	.....	....	.....	....	13.05	+12	.....	....	.....	....
5317.26	17.87	+61	17.39	+13	17.59	+33	17.56	+30	17.58	+32	.....	....
5368.55	.....	....	68.50	− 5	.....	....	68.91	+36	.....	....	69.13	+58
5374.65	75.34	+69	74.74	+ 9	.....	....	75.03	+38	74.78	+13	75.00	+35
5379.96	.....	....	.....	....	.....	....	80.45	+49	.....	....	.....	....
5411.89	.....	....	.....	....	.....	....	.....	....	12.07	+18	.....	....
5416.56	.....	....	.....	....	17.11	+55	.....	....	.....	....	.....	....
5422.55	23.19	+64	22.60	+ 5	.....	....	.....	....	.....	....	.....	....
5431.75	.....	....	31.96	+20	.....	....	.....	....	.....	....	32.25	+50
5450.40	.....	....	.....	....	.....	....	.....	....	50.65	+15	50.92	+52
5564.02	64.45	+43	.....	....	64.83	+81	.....	....	.....	....	.....	....
5586.45	86.93	+48	86.77	+32	86.99	+54	87.21	+76	.....	....	.....	....
5692.68	.....	....	.....	....	.....	....	.....	....	.....	....	93.19	+51
5710.18	.....	....	10.62	+44	.....	....	.....	....	.....	....	.....	....
Mean Δ, t.m..........	+.41		+.26		+.56		+.45		+.24		+.52	
Mean Δ, km..........	+26		+16		+34		+27		+14		+33	
V of 132 *Schj*........	−28		−28		−28		−28		−28		−28	
Velocity in km.......	− 2		−12		+ 6		− 1		−14		+ 5	

RADIAL VELOCITY OF 280 *SCHJELLERUP*

From bright lines compared with 19 *Piscium*

The character of the spectrum of 280 *Schjellerup* differs so much from that of 132 *Schjellerup* that direct comparison of the bright lines was unsatisfactory; therefore they were compared with the lines in 19 *Piscium*, a star more nearly like 280 *Schjellerup* in development.

19 *Piscium*	280 *Schjellerup*	Δ λ	19 *Piscium*	280 *Schjellerup*	Δ λ
t.m.	t.m.	t.m.	t.m.	t.m.	t.m.
4617.77	17.36	− .41	5531.92	31.20	− .72
4631.12	30.59	− .53	5571.81	71.57	− .24
4638.72	37.65	−1.07	5580.71	81.09	− .38
4660.88	60.09	− .79	5724.08	23.96	− .12
5453.81	52.18	−1.63	5756.98	57.57	− .59
5459.10	58.61	− .49			

Mean −.46 t.m.
= −25 km.

MEAN RADIAL VELOCITIES

The final adopted velocities are the means of the direct determinations by dark lines and the comparison of the bright lines with those of 132 *Schjellerup*. The close agreement in certain stars of the results obtained with the dark and bright lines is of course purely fortuitous, as the values in either case may be many kilometers in error.

STAR	DARK LINES		BRIGHT LINES COMPARED WITH 132 *Schj.*		MEAN
	V	No. Lines	V	No. Lines	V
132 *Schjellerup*.......	−28	..	....	..	−28
280 *Schjellerup*.......	−25	17	−25	16	−25
19 *Piscium*...........	− 2	24	− 2	13	− 2
318 *Birmingham*.....	− 8	15	−12	14	−10
74 *Schjellerup*.......	+ 3	13	+ 6	9	+ 5
78 *Schjellerup*........	− 1	14	− 1	13	− 1
115 *Schjellerup*.......	−11	9	−14	11	−13
152 *Schjellerup*.......	− 4	13	+ 6	16	+ 1

For a check on these results see the table on p. 118.

TABLE OF CORRECTIONS FOR RADIAL VELOCITY

The corrections to be applied to the measured wave-lengths of the star lines (after reduction to the Sun) to eliminate the displacements due to radial velocity are given in the following table. The displacements are given in hundredths of an Ångström unit.

V in km. / λ	1	2	5	10	13	25	28	V in km. / λ	1	2	5	10	13	25	28
4200	1	3	7	14	18	35	39	5100	2	3	9	17	22	43	48
4300	1	3	7	14	19	36	40	5200	2	3	9	17	23	43	49
4400	1	3	7	15	19	37	41	5300	2	4	9	18	23	44	50
4500	2	3	8	15	20	38	42	5400	2	4	10	18	23	45	50
4600	2	3	8	15	20	38	43	5500	2	4	10	18	24	46	51
4700	2	3	8	16	20	39	44	5600	2	4	10	19	24	47	52
4800	2	3	8	16	21	40	45	5700	2	4	10	19	25	48	53
4900	2	3	8	16	21	41	46	5800	2	4	10	19	25	48	54
5000	2	3	8	17	22	42	47								

TABLE OF MEAN WAVE-LENGTHS CORRECTED FOR RADIAL VELOCITY

The following table contains the mean wave-lengths of the lines measured in each star, with the correction for radial velocity, and the final mean of all the wave-lengths of the same line measured in each star. The stars are arranged in the assumed order of development.

No.	280 *Schjellerup*			19 *Piscium*			318 *Birmingham*			74 *Schjellerup*		
	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length
			t.m.	•		t.m.			t.m.			t.m.
1	...	....	....	...	....	.....	...	....	.....	...	....	.....
1a	...	....	....	...	....	.....	...	....	.....	...	....	.....
2	...	....	....	10	w D	84.08	...	....	.....	...	....	.....
3	...	....	....	2–3	n D	90.33	...	nn D	90.03	...	....	.....
4	...	....	....	...	....	.....	...	....	.....	...	....	.....
5	...	....	....	6–7	w D	94.83	...	wn D	95.17	...	wn D	95.06
6	...	....	....	...	....	.....	...	....	.....	...	....	.....
	...	....	....	...	....	.....	...	....	.....	...	....	.....
7	...	....	....	1	D	97.65	...	....	.....	...	....	.....
8	...	....	....	2	D	00.87	...	wn D	01.02	...	wn D	00.7
9	...	....	....	3	B	02.47	3–4	n B	02.47	2–3	n B	02.61
10	...	....	....	...	....	.....	...	....	.....	...	....	.....
11	...	....	....	7	w D	04.98	2-3	wn D	05.15	...	nn D	05.1
12	...	....	....	3	D?	08.51	...	....	.....	...	wn D	08.61
13	...	....	....	...	....	.....	...	....	.....	...	....	.....
	...	....	....	...	....	.....	...	....	.....	...	....	.....
14	...	....	....	...	....	.....	...	....	.....	...	....	.....
15	...	....	....	1	D?	12.29	...	....	.....	...	....	.....
16	...	....	....	...	....	.....	...	B?	09.8	...	....	.....
	...	....	....	...	....	.....	...		14.2	...	....	.....
17	...	....	....	3	n D	15.17	2–3	n D	15.11	...	nn D	15.3
18	...	....	....	...	....	.....	...	....	.....	...	....	.....
19	...	....	....	...	....	.....	...	....	.....	...	....	.....
	...	....	....	...	....	.....	...	....	.....	...	....	.....
20	...	....	....	2–3	wn D	20.60	...	....	.....	...	....	.....
21	...	....	....	...	B?	.....	...	....	.....	...	....	.....
22	...	....	....	...	....	.....	...	....	.....	...	....	.....
23	...	....	....	...	....	.....	...	....	.....	...	....	.....
24	...	....	....	...	....	.....	1–2	n D	25.86	...	....	.....
25	...	....	....	1	B	26.81	...	....	.....	...	....	.....
26	...	....	....	2	D	27.49	2–3	n D	27.96	3	nn D	27.8
27	...	nn D	4429.51	2–3	n D	30.18	1–2	n D	30.27	...	nn D	30.42
28	...	....	....	...	....	.....	...	....	.....	...	....	.....
	...	....	....	...	....	.....	...	....	.....	...	....	.....
29	...	....	....	...	....	.....	1	n D	33.96	...	....	.....
30	...	....	....	...	....	.....	...	B	31.0	...	....	.....
	...	....	....	...	....	.....	...		33.60	...	....	.....
31	3	nn D	4435.22	5	w D	35.52	5	wn D	35.49	...	wn D	35.72
32	...	....	....	...	....	.....	...	....	.....	...	....	.....
	...	....	....	...	....	.....	...	....	.....	...	....	.....
33	...	....	....	1	D	38.13	1–2	n D	38.23	...	....	.....
34	...	....	....	2	B??	38.89	5–6	n B	39.10	...	....	.....
35	...	B?	37.0	...	....	.....	...	....	.....	...	....	.....
	...		39.9	...	....	.....	...	....	.....	...	....	.....
36	...	....	....	2–3	n D	44.45	1–2	D	44.45	...	....	.....
37	...	....	....	...	B??	.....	...	....	.....	...	....	.....
38	...	....	....	...	....	.....	...	B	45.0	...	....	.....
	...	....	....	...	....	.....	...		46.8	...	....	.....
39	...	....	....	...	....	.....	...	....	.....	...	....	.....
40	...	....	....	...	....	.....	...	....	.....	...	....	.....
41	...	....	....	1–2	n D??	47.14	2	n D	47.47	...	....	.....
42	...	....	....	2–3	n B?	48.68	4	n B	48.61	5	n B	48.88
43	...	....	....	5	n D	49.96	...	wn D	50.04	...	nn D	50.35
44	...	....	....	...	....	.....	...	....	.....	...	....	.....
45	...	....	....	2–3	n D	55.23	1	n D	55.35	...	nn D	55.8
46	...	....	....	...	....	.....	...	....	.....	...	....	.....
47	...	....	....	...	....	.....	...	....	.....	...	....	.....
48	...	....	....	...	....	.....	...	....	.....	...	....	.....
49	...	....	....	...	....	.....	...	....	.....	...	nn D	60.01
	...	....	....	...	....	.....	...	....	.....	...		
50	...	....	....	3	n D	62.17	3	n D	62.07	...	nn D	62.48
51	...	nn B??	4463.76	3–4	w B	64.04	6	n B	63.91	...	w B	64.0

TABLE OF MEAN WAVE-LENGTHS CORRECTED FOR RADIAL VELOCITY

78 *Schjellerup*			132 *Schjellerup*			115 *Schjellerup*			152 *Schjellerup*			Mean Wave-Length
Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	
		t.m.			t.m.			t.m.			t.m.	t.m.
...	....	.....	...	head	71.80	...	....	.....	...	....	.....	4371.8
...	....	.....	...	head	80.63	...	....	.....	...	....	.....	4380.6
...	....	.....	1	n D	85.20	...	....	.....	...	....	.....	4384.6
2	n D	89.82	1–2	n D	89.77	...	....	.....	...	....	.....	4390.0
...	....	.....	2	n D	91.95	...	....	.....	...	....	.....	4391.9
8	wn D	95.10	...	n D	95.1	...	....	.....	...	....	.....	4395.0
...	....	.....	...	con.	95.8	...	....	.....	...	....	.....	439
...	....	.....	...	spec.	97.9	...	....	.....	...	....	.....	
...	....	.....	1–2	n D	98.24	...	....	.....	...	....	.....	4397.9
8	wn D	01.14	1–2	wn D	00.89	...	....	.....	...	....	.....	4401.0
...	n B?	02.68	2	n B	02.47	...	....	.....	2–3	B??	02.70	4402.6
...	....	.....	4	D?	03.30	...	....	.....	...	....	.....	4403.3
...	nn D	05.21	1–2	wn D	05.24	...	nn D?	04.92	3	n D?	04.91	4405.1
3	nn D	08.75	1	wn D	08.52	1	n D?	07.90	...	....	.....	4408.5
...	....	.....	...	....	.....	...	....	.....	...	D	03.3	440
...	....	.....	...	....	.....	...	....	.....	...		09.6	
...	....	.....	...	n D??	11.20	...	....	.....	1	n D	10.58	4410.9
...	....	.....	1–5	nn D?	12.23	...	....	.....	1–2	n D	12.45	4412.3
...	....	.....	...	con.	12.7	...	....	.....	...	....	.....	
...	....	.....	...	spec.	14.7	...	....	.....	...	....	.....	4418.5
3	nn D	15.18	1–3	n D	15.28	...	....	.....	3–4	n D	15.45	4415.2
...	....	.....	2	D?	16.71	...	....	.....	...	....	.....	4416.7
...	....	.....	...	con.	18.0	...	....	.....	...	....	.....	441
...	....	.....	...	spec.	20.3	...	....	.....	...	....	.....	
...	nn D	20.5	2	n D	20.60	...	....	.....	...	....	.....	4420.6
...	....	.....	2	n B?	21.18	...	....	.....	1	B?	20.81	4421.0
...	....	.....	2–3	D	21.70	...	....	.....	...	....	.....	4421.7
...	....	.....	3	n B?	23.99	...	....	.....	2	B??	23.88	4423.9
...	nn D	26.25	1–6	nn D?	25.86	...	....	.....	2	n D	25.80	4425.9
...	....	.....	6	B??	16.69	...	....	.....	...	....	.....	4426.8
1	nn D	27.63	1–6	n D	27.72	...	....	.....	2	n D	27.74	4427.7
1	nn D	30.37	1–2	n D	30.28	...	....	.....	2–3	n D	30.54	4430.2
...	....	.....	...	D	29.6	...	....	.....	...	....	.....	442
...	....	.....	...		30.9	...	....	.....	...	....	.....	
...	....	.....	1	n D?	33.92	...	....	.....	...	....	.....	4433.9
...	....	.....	...	con.	30.9	...	....	.....	...	....	.....	4431.0
...	....	.....	...	spec.	35.0	...	....	.....	...	....	.....	4434.3
6–7	wn D	35.92	3	wn D	35.60	4–5	wn D	35.47	6	wn D	35.97	4435.6
...	....	.....	...	D	35.0	...	....	.....	...	....	.....	443
...	....	.....	...		36.3	...	....	.....	...	....	.....	
1	nn D	38.14	1–7	n D	38.14	...	....	.....	1–2	n D	38.25	4438.2
2–3	n B	39.44	4	n B	38.86	3	n B?	38.71	...	B??	.....	4439.0
...	....	.....	...	....	.....	...	....	.....	...	....	.....	443
2	n D	44.58	1–6	n D	44.51	...	....	.....	1	n D	44.64	4444.5
...	....	.....	5	B?	45.16	...	....	.....	2	B	45.32	4445.2
...	....	.....	...	....	.....	...	....	.....	...	....	.....	444
...	....	.....	2	D??	45.68	...	....	.....	2	D	45.79	4445.7
...	....	.....	3	n B?	46.14	...	....	.....	1	n B??	46.37	4446.3
1	nn D	47.66	2	n D??	47.44	...	....	.....	2	n D?	47.57	4447.5
2–3	n B	48.88	8	n B	48.65	...	....	.....	...	....	.....	4448.7
3	n D	50.32	2–3	n D??	50.04	2–3	wn D	50.02	...	wn D??	50.3	4450.1
...	....	.....	5	B	54.23	...	....	.....	...	....	.....	4454.2
1–2	n D	55.52	1–3	D?	55.33	...	....	.....	1	n D	55.38	4455.4
...	....	.....	0–1	D?	56.76	...	....	.....	...	....	.....	4456.7
...	....	.....	...	....	.....	...	....	.....	1	n D	58.08	4458.1
...	....	.....	4	n B??	58.81	...	....	.....	1	B?	58.72	4458.8
...	....	.....	...	D?	59.3	...	....	.....	...	....	.....	445
...	....	.....	...		60.1	...	....	.....	...	....	.....	
2	n D	62.24	8	w D	62.10	...	n D?	62.2	4–5	n D	62.05	4462.2
3	n B	63.84	2–8	B	64.08	...	....	.....	2–7	n B	64.09	4464.0

TABLE OF MEAN WAVE-LENGTHS CORRECTED FOR RADIAL VELOCITY—*Continued*

No.	280 *Schjellerup*			19 *Piscium*			318 *Birmingham*			74 *Schjellerup*		
	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length
			t.m.			t.m.			t.m.			t.m.
52	... ...	....	....	... ...	....	....	... ...	....	....	... ...	B	63.1 64.80
53	4	wn D	4465.96	1	D?	65.29	1	n D	65.43	...	....	.....
54	...	....	....	...	....	.....	...	....	.....	...	....	.....
55	...	....	....	1–2	D	68.95	...	....	.....	...	....	.....
56	1	n D	4471.64	1	D??	72.25	1	nn D	71.72	...	....	.....
57	... ...	....	....	... ...	....	....	... ...	....	....	... ...	....	....
58	...	....	....	...	B?	.....	...	....	.....	...	....	.....
59	...	....	....	...	....	.....	...	B	72.4	...	....	.....
60	... ...	....	....	... ...	....	....	... ...	B	72.4 74.5	... ...	....	....
61	...	....	....	...	....	.....	...	....	.....	...	....	.....
62	...	....	....	1–2	n D	75.52	1	n D	76.18	1	nn D	75.4
63	...	....	....	...	B?	.....	...	B??	.....	max	B	79.0
64	...	....	....	1–2	n D??	80.00	1	nn D	80.42	1	nn D?	80.22
65	1	nn D	4481.74	2–3	D	82.19	2–3	n D	82.41	1	nn D	82.34
66	...	....	....	2–3	n B	83.62	2	n B	83.64	...	....	.....
67	... ...	....	....	... ...	....	....	... ...	....	....	... ...	....	....
68	...	....	....	2	B?	86.03	1–2	n B?	86.27	...	....	.....
69	...	....	....	1–2	D	87.57	2	nn D	87.42	1–2	nn D	87.61
70	...	....	....	3	B?	88.61	...	....	.....	...	....	.....
71	1	n D	4489.35	2–3	D	89.75	3	n D	89.80	1	D	90.05
72	... ...	....	....	... ...	....	....	... ...	....	....	... ...	....	....
73	...	wn D	4496.73	4–5	D	97.02	...	wn D	96.97	2	n D	97.21
74	... ...	....	....	... ...	B??	98.0 01.1	... ...	....	....	... ...	....	....
75	...	nn D	4501.22	4	D	01.78	2–3	nn D	01.87	1–2	nn D	01.97
76	...	....	....	...	....	.....	...	....	.....	...	....	.....
76a	...	head	....	...	head	02.3	...	head	02.6	...	head	02.5
77	... ...	....	....	... ...	....	....	... ...	B	02.5 06.3	... ...	B	02.5 06.3
78	2	n D	4506.38	6	D	06.77	2–3	n D	07.08	2–3	n D	07.04
79	...	....	....	...	B??	.....	6	n B?	08.64	...	....	.....
80	...	....	....	1	D?	09.77	1	n D	09.56	1	nn D	09.91
81	...	....	....	...	B??	.....	4	B??	10.8	...	....	.....
82	... ...	....	....	... ...	....	....	... ...	....	....	... ...	....	....
83	3?	nn D	4512.83	...	wn D	12.76	2	nn D	12.64	...	nn D	12.3
83a	...	....	....	...	head	14.3	...	....	.....	...	....	.....
84	...	....	....	1	D?	16.17	...	....	.....	...	....	.....
85	...	....	....	2	n B	17.05	max	B	17.71	...	....	.....
86	1–2	n D	4518.15	3–4	D	18.27	3	n D	18.31	1–2	n D	18.38
87	...	....	....	1	D??	20.54	...	....	.....	...	....	.....
88	1–2	nn B	4521.15	3–4	B	21.66	3	wn B	21.67	8	wn B	21.91
89	... ...	....	....	... ...	....	....	... ...	....	....	... ...	....	....
90	1	n D	4522.91	4	D	23.00	4–5	D	23.06	1–2	nn D	23.20
91	...	....	....	...	B??	.....	...	....	.....	...	....	.....
92	... ...	....	....	... ...	....	....	... ...	....	....	... ...	....	....
93	...	....	....	5	n D	27.16	...	....	.....	0	nn D	27.40
94	...	....	....	...	....	.....	1	nn D	28.65	...	....	.....
95	...	....	....	2–3	D	31.35	1	nn D	31.43	1	nn D	30.96
95a	...	....	....	...	head	31.9	...	....	.....	...	....	.....
96	...	....	....	...	....	.....	...	....	.....	...	....	.....
97	...	w D	4535.30	6	w D	35.84	...	nn D	35.84	...	nn D	35.90
98	... ...	D	4530.7 4535.8	... ...	....	....	... ...	D	..... 36.6	... ...	....	....
99	...	w D	4537.98	3	B	37.32	3	wn B	37.38	...	....	.....
100	...	....	....	2–3	B	39.00	2	n B?	38.89	...	....	.....
101	... ...	....	....	... ...	....	....	... ...	B	36.5 39.7	... ...	B	36.6 39.9
102	1	n D	4539.89	2	D	40.42	4	n D	40.51	1–2	nn D	40.57
103	...	....	....	1	D??	42.75	...	....	.....	...	....	.....
104	...	....	....	2	B	44.10	...	....	.....	...	....	.....
105	...	....	....	...	....	.....	...	....	.....	...	....	.....

TABLE OF MEAN WAVE-LENGTHS CORRECTED FOR RADIAL VELOCITY—*Continued*

78 *Schjellerup*			132 *Schjellerup*			115 *Schjellerup*			152 *Schjellerup*			Mean Wave-Length
Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	
		t.m.			t.m.			t.m.			t.m.	t.m.
...	B	62.9	...	B	63.0	...	....	.....	...	B	.....	4463.0
...		65.1	...		64.8	...	....	.....	...		64.6	4464.9
1	n D	65.37	1	n D??	65.76	...	....	.....	...	n D??	64.88	4465.4
...	....	.....	2	D	66.90	...	....	.....	...	....	.....	4466.9
1	n D	68.68	1	n D	69.02	...	....	.....	1	n D	68.48	4468.8
2	nn D	71.58	2	n D??	71.72	1	D	70.85	1	n D??	71.81	4471.7
...	D	65.0	...	....	.....	...	....	.....	...	con.	64.6	4464.7
...		72.0	...	....	.....	...	....	.....	...	spec.	72.6	4472.0
...	....	.....	2	B.?	72.32	...	....	.....	1	n B??	72.57	4472.4
...	....	.....	4–5	B	73.55	...	....	.....	3	n B	73.56	4473.6
...	....	.....	...	B	73.0	...	....	.....	...	....	.....	4472.7
...	....	.....	...		75.0	...	....	.....	...	....	.....	4474.7
...	....	.....	1	n D	75.31	...	....	.....	...	....	.....	4475.3
1	n D	75.33	1	D	75.82	...	....	.....	...	....	.....	4475.6
...	....	.....	3	B	79.08	1	B?	78.58	...	wn B??	78.78	4478.8
1	nn D?	80.21	2–3	n D??	80.13	...	....	.....	2	n D??	79.96	4480.2
2	n D	82.23	2–5	D	82.50	...	....	.....	2	n D	82.43	4482.3
...	....	.....	1	B??	83.46	2	nn B??	84.13	...	....	.....	4483.7
...	....	.....	.....	con.	83.0	...	....	.....	...	B?	82.9	448
...	....	.....	.....	spec.	86.	...	....	.....	...		87.8	
...	....	.....	5	n B??	86.15	2	n B??	85.87	...	....	.....	4486.1
1	nn D	87.62	1–3	n D	87.33	...	....	.....	1	nn D?	87.28	4487.5
...	....	.....	1–5	B??	88.70	...	....	.....	1	B?	88.84	4488.7
2–3	n D	89.86	2–3	n D	89.77	...	....	.....	3	nn D	89.61	4489.7
...	....	.....	...	con.	90.4	...	....	.....	...	B?	90.4	4490.4
...	....	.....	...	spec.	96.2	...	....	.....	...		.....	4496.
3–4	n D	96.97	6–8	w D	96.99	1–2	n D	97.04	...	....	.....	4497.0
...	....	.....	...	con.	98.0	...	....	.....	...	....	.....	4498.0
...	....	.....	...	spec.	01.3	...	....	.....	...	....	.....	4501.2
1	nn D	01.87	1–8	w D	01.92	1	nn D	00.91	1	n D	02.15	4501.7
...	....	.....	3	B??	03.14	1	n B?	03.91	2–3	nn B??	03.79	4503.6
...	head	02.7	...	head	02.71	...	....	.....	...	....	.....	4502.8
...	B	02.7	...	B	02.4	...	....	.....	...	....	.....	4502.5
...		06.2	...		06.0	...	....	.....	...	....	.....	4506.2
3–4	wn D	07.09	2	wn D	07.12	2	n D	06.74	2	nn D	07.24	4506.9
4	wn B	08.71	max	B??	08.65	3	n B	08.21	...	B??	.....	4508.6
1	nn D	09.84	1–3	n D??	09.89	...	....	.....	3	n D??	09.96	4509.8
...	....	.....	3	n B??	10.66	...	....	.....	...	....	.....	4510.7
...	B	08.30	...	B	08.3	...	....	.....	...	....	.....	4508.3
...		11.60	...		09.5	...	....	.....	...	....	.....	......
...	wn D	13.08	2	wn D	12.83	1–2	nn D	13.05	1	nn D	12.81	4512.8
...	....	.....	...	head	15.15	...	....	.....	...	....	.....	4514.7
...	....	.....	1	n D	16.34	...	....	.....	1	nn D?	16.02	4516.2
1–2	n B	17.13	4	n B??	17.31	...	....	.....	1	B??	17.20	4517.3
2–3	n D	18.53	1–3	n D	18.35	1–2	n D	18.21	1–2	wn D?	18.23	4518.3
...	....	.....	1	n D??	20.71	...	....	.....	1	nn D??	20.16	4520.5
4	B	21.89	3	B??	21.75	...	....	.....	...	B??	.....	4521.7
...	....	.....	...	B	20.9	...	....	.....	...	....	.....	452
...	....	.....	...		22.4	...	....	.....	...	....	.....	
4	n D	23.23	4–6	w D	23.17	2–3	n D	23.08	5	n D	23.21	4523.1
3–4	n B	25.01	3	B??	24.68	3	n B??	24.59	2-5	B?	24.63	4524.7
...	B	24.1	...	B	23.9	...	....	.....	...	....	.....	4524.0
...		26.0	...		27.3	...	....	.....	...	....	.....	4527.
...	wn D	27.56	1	n D?	27.2	...	n D?	27.48	...	....	.....	4527.4
...	....	.....	3	D	28.69	...	....	.....	...	....	.....	4528.7
1	n D?	31.32	1	n D	31.29	...	....	.....	...	....	.....	4531.3
...	....	.....	...	head	32.73	...	....	.....	...	....	.....	4532.3
...	....	.....	3	n D	33.44	...	....	.....	...	....	.....	4533.4
2–3	n D	35.70	6–8	wn D?	36.04	...	n D	35.56	1–2	n D	36.21	4535.7
...	D	31.1	...	....	.....	...	....	.....	...	....	.....	4530.9
...		36.7	...	....	.....	...	....	.....	...	....	.....	4536.3
2	n B?	37.32	2–3	n B?	37.45	...	n B?	37.08	2–4	n B	37.68	4537.5
2–3	B	39.18	3-6	n B??	39.00	1	B	38.66	4–5	B	39.16	4539.0
...	....	.....	...	B	36.6	...	....	.....	...	B	37.2	4536.7
...	....	.....	...		40.0	...	....	.....	...		40.2	4540.0
3	n D	40.66	3	wn D?	40.46	...	....	.....	1	n D	40.44	4540.4
...	....	.....	2	n D??	42.51	...	....	.....	2–3	wn D??	43.06	4542.8
1	B	44.25	...	max B??	44.40	...	....	.....	1	n B?	44.10	4544.2
...	....	.....	2	n D	44.92	...	....	.....	...	....	.....	4544.9

TABLE OF MEAN WAVE-LENGTHS CORRECTED FOR RADIAL VELOCITY—*Continued*

No.	280 *Schjellerup*			19 *Piscium*			318 *Birmingham*			74 *Schjellerup*		
	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length
			t.m.			t.m.			t.m.			t.m.
106	...	....	....	3	B	47.79	4	n B?	47.71	max	B	47.56
107	...	....	....	...	....	.....	...	....	.....	...	B	46.8 48.5
108	...	....	....	5	wn D	49.25	...	wn D	49.37	...	....	.....
109	...	....	....	...	....	.....	...	....	.....	...	....	.....
110	...	....	....	...	....	.....	...	....	.....	...	....	.....
111	...	....	....	...	....	.....	...	....	.....	...	....	.....
112	9	w D	4553.58	10	w D	53.54	...	wn D	53.58	...	wn D	54.07
113	...	....	....	...	D	51.8 54.7	...	D	52.3 55.3	...	....	.....
113a	...	....	....	...	head	54.70	...	head	55.3	...	....	.....
114	...	....	....	...	....	.....	...	....	.....	max	B	58.40
115	...	B	4555.5 4559.3	...	B	55.3 59.3	...	B	55.3 59.4	...	B	55.40 59.90
116	...	nn D?	4560.11	3	n D	60.39	5	nn D	60.42	...	nn D	60.48
117	...	....	....	3	n B	61.91	...	....	.....	...	....	.....
118	1	D	4562.93	2–3	D??	63.35	3	D	63.54	...	nn D	63.47
119	...	....	....	...	B??	.....	...	....	.....	...	....	.....
120	0–1	D	4565.22	1–2	D??	65.73	1–2	D	65.71	1	n D	65.74
121	...	....	....	...	....	.....	...	....	.....	...	....	.....
122	...	....	....	...	....	.....	...	....	.....	...	....	.....
123	...	B	4565.90 4569.50	...	B	66.3 70.0	...	B	66.2 70.5	...	....	.....
124	...	....	....	...	....	.....	...	....	.....	...	....	.....
125	...	nn D	4571.57	9	w D??	71.66	...	wn D	71.79	...	nn D	71.30
126	...	....	....	...	....	.....	...	....	.....	...	....	.....
127	...	....	....	3	n D	75.27	...	nn D?	75.10	...	....	.....
128	...	....	....	3–4	n D	77.57	1	nn D	77.47	...	n D	77.60
129	...	....	....	...	....	.....	...	D	70.9 76.9	...	....	.....
129a	...	....	....	...	head	78.1	...	head	77.0	...	....	.....
130	...	....	....	...	....	.....	...	....	.....	...	....	.....
131	...	....	....	...	....	.....	...	....	.....	...	....	.....
132	...	....	....	...	....	.....	...	....	.....	...	....	.....
133	...	....	....	1	D	80.42	1	nn D	80.52	...	....	.....
134	...	....	....	...	....	.....	...	....	.....	...	....	.....
135	...	....	....	1	D??	81.93	1	nn D	82.57	...	....	.....
136	5–6	wn B	4583.59	2	n B	83.67	...	....	.....	...	....	.....
137	...	....	....	1–2	D	84.57	1	n D	84.82	...	....	.....
138	...	....	....	1	B?	85.41	...	....	.....	...	....	.....
139	2	n D	4586.38	2	n D	86.37	1	nn D?	86.10	...	....	.....
140	...	....	....	...	....	.....	...	....	.....	...	....	.....
141	...	....	....	...	....	.....	...	....	.....	...	....	.....
142	...	....	....	...	....	.....	...	....	.....	...	....	.....
143	...	....	....	...	....	.....	...	....	.....	...	....	.....
144	...	....	....	1	D?	91.01	1–2	nn D	91.26	...	....	.....
145	...	....	....	...	....	.....	...	....	.....	...	....	.....
146	1	n D	4594.19	2–3	n D	94.34	2	nn D	94.30	...	nn D	94.69
147	2	nn B?	4596.11	2	n B	95.80	5	n B	96.10	4	n B	96.15
149	...	....	....	...	....	.....	...	....	.....	...	....	.....
150	...	....	....	1	n D??	97.52	2	n D	97.61	...	....	.....
151	1	n B?	4599.58	...	....	.....	...	....	.....	...	....	.....
152	...	....	....	1–2	n D	00.84	3	n D	00.61	1	n D	00.87
153	...	....	....	...	....	.....	...	....	.....	...	....	.....
154	...	....	....	...	....	.....	...	....	.....	...	....	.....
155	...	....	....	...	....	.....	...	....	.....	...	....	.....
156	7–8	D	4606.26	9	w D	06.87	10	w D	06.86	8	w D	06.88
157	...	....	....	...	....	.....	...	....	.....	...	....	.....
158	...	head	4607.5	...	head	07.9	head	....	08.3	...	....	.....
159	...	....	....	...	....	.....	...	D	05.7 08.3	...	....	.....
160	3	n B	4608.47	2–3	n B	08.71	2	n B?	09.19	5	n B??	08.90
161	...	B	4607.5 4615.0	...	....	.....	...	B	08.3 13.1	...	....	.....
162	...	....	....	1	n D??	10.07	1	nn D?	10.57	1	n D	10.56

TABLE OF MEAN WAVE-LENGTHS CORRECTED FOR RADIAL VELOCITY—*Continued*

78 *Schjellerup*			132 *Schjellerup*			115 *Schjellerup*			152 *Schjellerup*			Mean Wave-Length
Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	
		t.m.			t.m.			t.m.			t.m.	
2–3	n B	47.75	4–6	B	47.63	1	B	47.81	4	n B	47.73	4547.7
...	....	.....	...	....	.....	...	....	.....	...	....	.....	{ 454
...	....	.....	...	....	48.8	...	....	.....	...	....	.....	
3	wn D	49.25	1	nn D?	49.47	...	....	.....	5–6	n D	49.27	4549.3
...	....	.....	...	D	{ 48.8	...	....	.....	...	....	.....	{ 454
...	....	.....	...		50.1	...	....	.....	...	....	.....	
...	....	.....	...	B	{ 50.0	...	....	.....	...	....	.....	{ 455
...	....	.....	...		52.3	...	....	.....	...	....	.....	
...	....	.....	...	nn D?	52.85	...	....	.....	...	wn D	52.65	4552.8
7	wn D	53.79	4	w D	54.21	4	n D	54.09	...	....	.....	4553.8
...	D	{	...	D	{ 52.1	...	....	.....	...	....	.....	4552.0
...		55.3	...		55.4	...	....	.....	...	....	.....	4555.1
...	....	.....	...	head	54.68	...	....	.....	...	....	.....	4554.9
...	....	.....	3–4	nn B??	58.88	...	....	.....	1	n B??	58.85	4558.7
...	B	{ 55.3	...	B	{ 55.3	...	....	.....	...	....	.....	4555.3
...		59.7	...		59.6	...	....	.....	...	....	.....	4559.5
4	n D	60.47	...	nn D??	60.23	...	nn D?	60.35	2	n D	60.21	4560.3
3–4	n B	62.10	1–3	B??	62.25	...	....	.....	1	n B??	62.27	4562.1
3	n D	63.51	2	n D	63.45	2	n D	63.56	...	....	.....	4563.5
2	n B??	64.71	2	n B??	64.57	...	....	.....	3	n B	64.68	4564.7
1	nn D	65.61	1	wn D??	65.95	5	n D	65.85	...	D?	.....	4565.8
...	....	.....	...	....	.....	...	....	.....	2–3	wn B	67.72	4567.7
...	....	.....	2–3	B??	69.46	...	....	.....	...	....	.....	4569.5
...	B	{ 66.3	...	B	{ 64.0	...	B	{ 66.8	...	....	.....	4566.3
...		70.3	...		70.0	...		69.4	...	....	.....	4569.8
...	....	.....	...	....	.....	...	....	.....	2	B	70.31	4570.3
...	n D	72.55	...	....	.....	...	....	.....	...	....	.....	4571.8
...	....	.....	2	B?	73.71	...	....	.....	...	....	.....	4573.7
...	....	.....	1	n D?	75.78	...	....	.....	...	....	.....	4575.4
1	n D?	77.26	1	n D?	77.61	...	....	.....	2	D	77.67	4577.5
...	D	{ 70.3	...	....	.....	...	D	{ 73.8	...	D	{ 70.9	4574.2
...		78.1	...	....	.....	...		77.2	...		78.4	4577.7
...	head	78.1	...	head	78.05	...	head	77.2	...	....	.....	4577.6
...	....	.....	4	B	78.52	...	....	.....	1–2	B?	78.56	4578.5
2	nn B?	79.37	...	....	.....	...	....	.....	2	n B	78.96	4579.2
...	....	.....	4	B	79.69	...	....	.....	1–2	B	79.67	4579.7
1–2	nn D	80.47	1–4	n D	80.38	...	....	.....	1–3	n D	80.50	4580.5
1	n B	81.68	4	B	81.20	...	....	.....	1–2	nn B?	81.19	4581.4
1–2	nn D	82.51	1	n D??	82.85	...	....	.....	...	n D	82.94	4582.6
2–3	n B	83.93	5	B	83.92	...	....	.....	1	B?	83.86	4583.8
...	....	.....	3	D	84.72	...	....	.....	...	n D?	84.72	4584.7
1	B	85.62	5	B	85.50	...	....	.....	...	....	.....	4585.5
1	n D	86.76	3	D	86.28	...	....	.....	2	D	86.37	4586.4
...	....	.....	2	B	86.89	...	....	.....	...	....	.....	4586.9
...	....	....:	2	D?	87.43	...	....	.....	...	....	.....	4587.4
...	....	.....	...	B??	.....	...	....	.....	2	B	89.07	4589.1
max	B	89.85	3–4	B?	90.39	...	....	.....	2	B?	90.54	4590.3
1	n D	91.39	4	n D	91.10	1	n D?	91.14	2	D	91.25	4591.2
...	....	.....	...	....	.....	...	....	.....	...	B	{ 89.9	{ 459
...	....	.....	...	....	.....	...	....	.....	...		93.2	
...	....	.....	3	D	94.10	...	....	.....	1–5	n D	93.93	4594.3
4	n B	96.04	4–6	nn B?	96.08	...	....	.....	max	B	(95.42)	4596.0
...	....	.....	...	....	.....	...	....	.....	...	B	{ 94.6	{ 459
...	....	.....	...	....	.....	...	....	.....	...		95.9	
1	nn D?	97.32	1	wn D?	97.33	0–1	n D	97.34	1–2	nn D??	97.37	4597.4
1	n B?	99.33	3–4	n B?	99.53	...	....	.....	max	B??	99.22	4599.5
2	n B	01.00	4	D	01.00	1	nn D	00.68	1	n D	00.89	4600.8
...	....	.....	4	B	02.01	...	....	.....	1	n B??	02.27	4602.1
...	....	.....	2	D	02.95	...	....	.....	...	nn D?	02.83	4602.9
...	....	.....	1	n D	06.23	...	....	.....	...	....	.....	4606.2
3–4	n D	07.20	...	w D	06.83	2–3	n D	06.24	...	wn D	06.37	4606.7
...	....	.....	4	n D	07.50	...	....	.....	...	....	.....	4607.5
...	head	08.2	...	head	08.01	...	head	08.5	...	....	.....	4608.1
...	D	{ 02.9	...	D	{ 03.0	...	n D	{ 05.4	...	....	.....	4605.6
...		08.3	...		08.5	...		08.5	...	....	.....	4608.4
2	n B?	09.17	...	B??	.....	...	....	.....	...	n D?	08.92	4608.9
...	B	{ 08.4	...	B	{ 08.2	...	....	.....	...	....	.....	4608.1
...		13.3	...		09.9	...	....	.....	...	....	.....	......
1	n D	10.22	2	D	10.17	...	....	.....	...	....	.....	4610.3

TABLE OF MEAN WAVE-LENGTHS CORRECTED FOR RADIAL VELOCITY—*Continued*

No.	280 *Schjellerup*			19 *Piscium*			318 *Birmingham*			74 *Schjellerup*		
	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length
			t.m.			t.m.			t.m.			t.m.
163	...	....	....	...	D??	.....	...	....	.....	...	....	.....
164	...	....	....	1–2	B??	12.32	1	n B??	12.39	...	....	.....
165	...	....	....	1–2	n D	13.80	2–3	n D	13.73	2	n D	13.77
166	...	....	....	3	B	14.95	5–6	n B	15.15	6	n B	15.03
167	1	n D	4616.06	2-3	D	16.29	3–4	n D	16.46	3	n D	16.31
168	...	....	....	...	....	.....	...	....	.....	...	....	.....
169	4	B	4617.74	6	B	17.80	7–8	n B	18.03	9	w B	17.99
170	1	n D	4619.29	5	D?	19.68	6	D	19.86	3	n D	19.70
171	...	....	....	4	B	21.35	5	n B	21.56	5	n B	21.58
172	...	....	....	1–2	n D??	22.81	2–3	nn D	23.05	1–2	nn D	23.09
173	...	....	....	...	....	.....	...	....	.....	...	....	.....
174	...	....	....	...	....	.....	...	....	.....	...	....	.....
175	...	....	....	...	....	.....	...	....	.....	...	....	.....
176	... ...	....	....	... ...	....	....	... ...	....	....	... ...	B	23.6 27.9
177	...	....	....	...	D??	.....	...	....	.....	...	....	.....
178	...	....	....	5	wn D	29.26	8	n D	29.54	6–8	nn D	29.12
179	...	....	....	...	....	.....	...	....	.....	...	....	.....
180	4	n B	4630.97	4	B	31.15	2	n B?	31.34	9	n B	31.18
181	...	....	....	...	....	.....	...	....	.....	...	....	.....
182	...	....	....	1	D	34.61	...	....	.....	1	nn D	34.6
183	...	....	....	2	D	37.46	1	nn D	37.41	...	....	.....
184	2	n B?	4638.03	3	B	38.75	3–4	n B	39.19	6	n B	39.03
185	3	n D	4639.86	5-6	D	40.29	6	D	40.46	5	D	40.76
186	... ...	....	....	... ...	....	....	... ...	....	....	... ...	....	....
187	1–2	n B	4642.10	3-4	B	41.72	4	wn B	42.16	8–9	w B	42.31
188	...	....	....	...	B??	.....	...	....	.....	...	....	.....
189	... ...	B	4640.6 4644.4	... ...	....	....	... ...	B	41.3 44.1	... ...	B	41.1 43.2
190	4	D	4646.05	...	wn D	45.70	...	....	.....	...	wn D	46.30
191	...	....	....	2–3	n B??	52.80	...	....	.....	1	nn B??	53.05
192	...	....	....	1	D?	54.04	...	....	.....	...	....	.....
193	...	nn D	4655.25	1	D	56.6	...	....	.....	...	wn D	56.30
194	2–3	n B	4660.48	...	w B	60.91	...	....	.....	...	....	.....
195	... ...	B	4657.5 4662.2	... ...	....	....	... ...	....	....	... ...	....	....
196	1	D?	4663.92	1–2	n D	64.14	...	....	.....	...	....	.....
197	1	n B?	4665.21	2	n B	65.41	...	....	.....	1–2	n B	65.24
198	4	n D	4668.15	3	wn D	68.08	...	....	.....	...	....	.....
199	2	n D	4674.79	4	D	75.13	...	....	.....	...	....	.....
200	...	wn D	4682.16	1	D?	82.29	...	....	.....	...	....	.....
201	...	....	....	1	n D??	88.43	...	....	.....	...	....	.....
202	...	....	....	1	n D?	91.12	...	....	.....	...	....	.....
203	...	....	....	3-4	n D	96.56	...	....	.....	...	....	.....
203a	...	....	....	...	head	97.2	...	....	.....	...	....	.....
204	...	....	....	...	D??	.....	...	....	.....	...	....	.....
205	...	....	....	...	....	.....	...	....	.....	...	....	.....
206	...	....	....	...	....	.....	...	....	.....	...	....	.....
207	5	n D	4714.49	6	w D	14.61	...	....	.....	...	wn D	15.00
208	...	....	....	...	....	.....	...	....	.....	...	....	.....
209	... ...	....	....	... ...	....	....	... ...	....	....	... ...	D	13.0 16.4
209a	...	....	....	...	head	14.8	...	....	.....	...	head	16.4
210	...	....	....	...	B??	.....	...	....	.....	...	....	.....
211	...	....	....	...	B??	.....	...	....	.....	...	....	.....
212	...	....	....	...	....	.....	...	....	.....	1–2	n B??	20.38
213	... ...	....	....	... ...	....	....	... ...	....	....	... ...	B?	16.4 21.3
214	...	....	....	1–2	n D	22.69	...	....	.....	1	n D	22.85
215	... ...	....	....	... ...	....	....	... ...	....	....	... ...	....	....
216	...	nn D	4728.61	...	....	.....	...	....	.....	1	nn D	28.5
217	...	....	....	...	....	.....	...	....	.....	...	....	.....
218	...	....	....	...	....	.....	...	....	.....	...	....	.....
219	...	....	....	10	w D	36.26	10	w D	36.3	10	w D	36.24
220	... ...	D	4733.5 4737.6	... ...	....	....	... ...	D	34.3 37.9	... ...	D	34.3 37.6
221	...	head	4737.6	...	head	37.61	...	head	37.9	...	head	37.6

TABLE OF MEAN WAVE-LENGTHS CORRECTED FOR RADIAL VELOCITY—*Continued*

78 *Schjellerup*			132 *Schjellerup*			115 *Schjellerup*			152 *Schjellerup*			Mean Wave-Length
Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	
		t.m.			t.m.			t.m.			t.m.	t.m.
...	....	.....	2	D??	11.32	...	....	.....	2	D??	11.42	4611.4
1	n B?	12.31	2	n B??	12.49	...	....	.....	2	B??	12.23	4612.3
2	n D	13.98	3-4	nn D	13.89	1-2	n D	13.91	1-3	n D	13.93	4613.9
6	B	15.21	4-9	n B	15.23	...	....	.....	2	B	15.14	4615.1
3	D	16.56	2-5	n D	16.36	3-8	w D	16.42	...	....	.....	4616.4
...	....	.....	1-2	B??	17.16	...	....	.....	...	B??	.....	4617.2
6-7	B	18.09	6-8	B	18.23	3	n B	17.74	4-8	B	18.15	4618.0
6	D	19.85	2	n D	19.56	1-2	n D	19.42	3-4	D	19.40	4619.6
5	B	21.51	2-6	n B??	21.51	...	....	.....	...	B??	.....	4621.5
2-3	n D	22.99	2	n D??	23.26	...	....	.....	1-2	n D??	22.47	4622.9
...	....	.....	4-5	B	24.18	...	....	.....	...	B??	.....	4624.2
...	....	.....	1-2	B	25.87	...	....	.....	...	....	.....	4625.9
...	n B?	27.9	2	B??	27.10	...	....	.....	...	....	.....	4627.1
...	....	.....	...	....	.....	...	....	.....	...	....	.....	462
...	....	.....	...	....	.....	...	....	.....	...	....	.....	
...	....	.....	1	n D??	28.66	...	....	.....	...	....	.....	4628.7
...	wn D	29.84	2	n D?	30.08	...	....	.....	...	....	.....	4629.6
...	....	.....	1	n B?	30.98	...	....	.....	...	....	.....	4631.0
...	....	.....	1	B??	31.60	...	....	.....	...	....	.....	4631.2
...	....	.....	2	n B?	31.68	...	....	.....	...	....	.....	4631.7
...	....	.....	1	D	34.14	...	....	.....	...	....	.....	4634.4
...	....	.....	1	n D?	37.60	...	....	.....	1	n D	38.07	4637.6
4-5	B	39.15	5-8	B	39.07	1-2	n B	38.78	1-4	n B	38.96	4638.9
5	D	40.60	4	D	40.59	1-2	nn D	40.37	5	wn D	40.55	4640.4
...	....	.....	...	D	39.5	...	....	.....	...	....	.....	464
...	....	.....	...		41.5	...	....	.....	...	....	.....	
3	n B	42.10	5-6	B	41.90	...	....	.....	...	B??	.....	4642.1
...	....	.....	3	B	43.33	...	....	.....	...	B??	.....	4643.3
...	....	.....	...	....	.....	...	....	.....	...	....	.....	4641.0
...	....	.....	...	....	.....	...	....	.....	...	....	.....	4643.9
...	n D	46.55	...	nn D?	46.86	...	....	.....	...	....	.....	4646.3
...	....	.....	4	B??	53.08	...	....	.....	...	....	.....	4653.0
...	....	.....	4	D	54.06	...	....	.....	...	....	.....	4654.0
1	n D	56.33	5	D	56.47	...	....	.....	...	....	.....	4656.4
...	....	.....	...	n B??	60.42	...	....	.....	...	B??	.....	4660.6
...	....	.....	...	....	.....	...	....	.....	...	....	.....	465
...	....	.....	...	....	.....	...	....	.....	...	....	.....	
...	....	.....	1-3	n D?	64.21	...	....	.....	...	....	.....	4664.1
...	n B?	65.44	3-4	B	65.26	...	....	.....	...	....	.....	4665.3
1	n D	68.60	2-3	n D	67.87	...	nn D?	67.73	...	....	.....	4668.1
...	....	.....	...	D??	.....	1-2	n D	74.92	...	....	.....	4674.9
...	....	.....	2	n D?	82.55	...	....	.....	...	....	.....	4682.3
...	....	.....	...	nn D??	88.78	...	....	.....	...	....	.....	4688.6
...	....	.....	...	D??	.....	...	....	.....	...	....	.....	4691.1
...	....	.....	...	D??	.....	1	n D?	97.41	...	....	.....	4697.0
...	....	.....	...	....	.....	...	....	.....	...	....	.....	4697.2
...	....	.....	1	n D??	01.98	...	....	.....	...	....	.....	4702.0
...	....	.....	1	n D	03.82	...	....	.....	...	....	.....	4703.8
...	....	.....	1-3	B	09.75	...	....	.....	...	....	.....	4709.8
1	nn D	14.97	...	D??	.....	...	....	.....	...	....	.....	4714.7
...	....	.....	...	wn D??	15.55	...	....	.....	...	....	.....	4715.6
...	....	.....	...	....	.....	...	....	.....	...	....	.....	471
...	....	.....	...	....	.....	...	....	.....	...	....	.....	
...	head	15.8	...	head	16.11	...	....	.....	...	....	.....	4716.1
max	B?	17.0	3	B	16.75	...	....	.....	...	....	.....	4716.8
...	....	.....	2	B??	18.13	...	....	.....	...	....	.....	4718.1
...	....	.....	2-3	B??	20.59	...	....	.....	...	....	.....	4720.5
...	con.	16.3	...	....	.....	...	....	.....	...	....	.....	4716.4
...	spec.	21.3	...	....	.....	...	....	.....	...	....	.....	4721.3
...	n D	22.69	2-3	n D	22.67	0-1	D	22.29	...	....	.....	4722.6
...	....	.....	...	con.	23.40	...	....	.....	...	....	.....	472
...	....	.....	...	spec.	27.70	...	....	.....	...	....	.....	
...	....	.....	...	D?	.....	1	D	29.71	...	....	.....	4729.2
...	....	.....	2	n B	31.63	...	....	.....	...	....	.....	4731.6
...	....	.....	1	n D??	32.51	...	....	.....	...	....	.....	4732.5
10	w D	36.43	10	w D	36.43	...	nn D	35.09	...	n D	36.6	4736.2
...	D	34.	...	D	.....	...	....	.....	...	....	.....	4734.0
...		38.	...		37.8	...	....	.....	...	....	.....	4737.7
...	head	37.7	...	head	37.61	...	....	.....	...	head	38.4	4737.7

TABLE OF MEAN WAVE-LENGTHS CORRECTED FOR RADIAL VELOCITY—*Continued*

No.	280 *Schjellerup*			19 *Piscium*			318 *Birmingham*			74 *Schjellerup*		
	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length
			t.m.			t.m.			t.m.			t.m.
222	4	n B	4739.10	8	B	38.62	5	n B	38.79	10	n B	38.69
223	...	....	....	1	D??	39.85	1	n D	40.14	...	....	.....
224	...	....	....	...	....	.....	...	....	.....	...	....	.....
225	... ...	B	4737.6 4741.2	... ...	....	....	... ...	B	37.9 41.7	... ...	B??	39.6 42.1
226	10	n D	4743.40	7–8	w D	43.94	10	w D	43.94	...	wn D	43.84
227	... ...	D	4741.2 4745.2	... ...	....	....	... ...	D	41.7 45.6	... ...	D	42.3 45.6
228	...	head	4745.37	...	....	.....	...	head	45.69	...	head	45.63
229	...	n B	4746.99	6–7	B	46.52	4	w B	46.77	...	....	.....
230	...	....	....	...	....	.....	...	....	.....	...	....	.....
231	... ...	B	4745.2 4748.8	... ...	....	....	... ...	B	45.8 48.7	... ...	B	45.6 48.6
232	...	....	....	2	n D	49.62	...	nn D	49.50	...	nn D	49.2
233	...	....	....	...	....	.....	...	....	.....	...	....	.....
234	...	....	....	...	D??	.....	...	....	.....	...	....	.....
235	...	....	....	...	....	.....	...	....	.....	...	....	.....
236	...	wn B	4755.71	3	B	55.07	...	....	.....	...	B	55.5
237	...	....	....	1	D?	56.23	...	....	.....	...	....	.....
238	...	....	....	2	B	56.94	...	....	.....	...	....	.....
239	... ...	....	....	... ...	....	....	... ...	....	....	... ...	B	53.3 57.7
240	4–5	n D	4758.99	3	n D	58.41	4	n D	58.62	3–4	nn D	58.83
241	...	....	....	...	B??	.....	...	....	.....	...	....	.....
242	...	....	....	...	B??	.....	...	....	.....	...	....	.....
243	... ...	....	....	... ...	....	....	... ...	....	....	... ...	B	60.1 65.8
244	1	n D?	4766.78	1	D	66.11	...	nn D	66.47	...	nn D?	66.33
245	...	....	....	...	B??	.....	...	....	.....	...	....	.....
246	...	....	....	...	B??	.....	...	....	.....	...	....	.....
247	... ...	....	....	... ...	....	....	... ...	....	....	... ...	B	67.1 72.1
248	...	....	....	1–2	n D	72.40	2–3	nn D	73.01	...	nn D	73.15
249	...	....	....	...	B?	.....	...	....	.....	...	....	.....
250	...	....	....	...	....	.....	...	....	.....	...	....	.....
251	... ...	....	....	... ...	....	....	... ...	....	....	... ...	B	73.9 78.2
252	...	wn D	4783.1	2	n D	84.17	...	....	.....	1–2	nn D	84.43
253	...	....	....	...	....	.....	...	....	.....	2	n D	89.26
254	...	....	....	...	....	.....	...	....	.....	...	....	.....
255	... ...	....	....	... ...	....	....	... ...	....	....	... ...	B	90.1 96.3
256	...	....	....	...	....	.....	...	....	.....	8	n B?	02.44
257	...	....	....	...	....	.....	...	....	.....	...	....	.....
258	...	....	....	...	....	.....	2	n B?	10.54	...	....	.....
259	...	....	....	...	....	.....	...	nn D	12.03	...	n D?	12.1
260	...	....	....	...	B?	.....	2	n B?	13.98	4	n B??	13.99
261	2	n D	4815.44	2	n D	15.80	3–4	n D	15.62	1	wn D	16.01
262	... ...	nn B?	4818.26	... ...	....	....	... ...	....	....	... ...	B	18.0 22.9
263	...	nn D?	4822.75	1–2	n D?	23.91	3	n D	23.86	...	wn D	23.51
264	2	n B?	4824.94	...	B??	.....	...	....	.....	4–5	wn B??	25.97
265	... ...	....	....	... ...	....	....	... ...	....	....	... ...	....	....
266	1	n D	4826.52	1–2	n D	27.81	3	n D	28.21	...	wn D	28.23
267	...	....	....	...	....	.....	3	n B	30.46	6	n B	30.36
268	2	n D	4832.49	1–2	n D	32.51	4–5	n D	32.56	5	n D	32.57
269	...	....	....	1	n D	36.30	...	....	.....	...	n D	36.2
270	...	nn D?	4839.78	1	n D	39.19	...	....	.....	...	wn D	39.50
271	...	....	....	1	D	43.49	1	D	43.62	1	nn D?	42.9
272	...	....	....	...	....	.....	...	....	.....	...	....	.....
273	... ...	....	....	... ...	....	....	... ...	....	....	... ...	....	....
274	...	....	....	...	....	.....	...	....	.....	...	....	.....
275	...	....	....	1	n D	55.34	...	nn D	55.47	1	n D	55.64
276	...	nn B?	4857.42	...	B??	.....	1	n B?	57.68	3	n B	57.68
277	...	....	....	1	n D	59.46	...	....	.....	...	....	.....
278	9	B	4861.38	...	....	.....	...	....	.....	...	....	.....

TABLE OF MEAN WAVE-LENGTHS CORRECTED FOR RADIAL VELOCITY—*Continued*

78 *Schjellerup*			132 *Schjellerup*			115 *Schjellerup*			152 *Schjellerup*			MEAN WAVE-LENGTH
Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	
		t.m			t.m.			t.m.			t.m.	t.m.
5	B	38.95	5–7	B	38.79	3–4	B	38.92	...	B??	39.50	4738.9
...	....	.....	...	n D??	39.84	1	n D	40.19	...	....	.....	4740.0
...	....	.....	4–5	n B	41.08	...	....	.....	...	....	.....	4741.1
...	con.	37.8	...	B	37.8	...	....	.....	...	B	38.4	4737.7
...	spec.	42.2	...		42.6	...	....	.....	...		41.1	4741.8
10	w D	44.01	10	w D	44.00	10	w D	43.67	...	....	.....	4743.8
...	D	42.2	...	....	.....	...	....	.....	...	D	41.1	4741.7
...		45.4	...	....	.....	...	....	.....	...		45.5	4745.7
...	head	45.43	...	head	45.21	...	head	45.43	...	head	45.5	4745.5
max	B	46.72	7	n B	46.38	4–5	B	46.70	max	B	47.05	4746.7
...	....	.....	6	n B	48.32	...	....	.....	...	....	.....	4748.3
...	B	45.8	...	....	.....	...	....	.....	...	B	45.5	4745.5
...		(57.9)	...	....	.....	...	....	.....	...		49.3	4748.9
1	n D	49.90	2–3	n D??	49.40	...	nn D?	49.49	...	....	.....	4749.5
...	....	.....	4	n B	50.43	...	....	.....	...	....	.....	4750.4
...	....	.....	...	D??	.....	...	....	.....	10	w D	51.59	4751.6
...	....	.....	...	....	.....	...	....	.....	...	head	53.06	4753.0
...	....	.....	5	n B?	55.16	...	nn B?	55.11	2	n B	55.07	4755.3
...	....	.....	...	n D??	56.06	...	....	.....	...	n D??	56.11	4756.1
...	....	.....	3	n B?	56.93	...	nn B?	56.40	4	B	57.04	4756.8
...	B	45.3	...	....	.....	...	....	.....	...	....	.....	4753.
...		58.3	...	....	.....	...	....	.....	...	....	.....	4758.0
2–3	n D	59.00	...	D?	.....	...	wn D	58.90	3	n D	59.34	4758.9
...	....	.....	3	n B??	60.07	...	....	.....	2–4	n B	60.80	4760.4
...	....	.....	...	n B??	62.93	...	....	.....	3	B	63.37	4763.2
...	....	.....	...	....	.....	...	....	.....	...	....	.....	476
...	....	.....	...	....	.....	...	....	.....	...	....	.....	
1	n D	66.55	...	nn D??	66.47	...	nn D	66.98	2	n D	66.54	4766.5
...	....	.....	...	....	.....	...	....	.....	2	n B?	67.94	4767.9
...	....	.....	...	....	.....	...	....	.....	1	n B?	69.58	4769.6
...	....	.....	...	....	.....	...	....	.....	...	....	.....	476
...	....	.....	...	....	.....	...	....	.....	...	....	.....	
1–2	nn D	72.70	1–2	nn D??	72.77	2	n D	72.15	...	D??	.....	4772.7
...	....	.....	...	nn B?	74.78	...	....	.....	3–4	n B	75.18	4775.0
...	....	.....	...	....	.....	...	....	.....	1–2	n D??	76.82	4776.8
...	B	74.0	...	....	.....	...	B	73.2	...	....	.....	4773.7
...		78.7	...	....	.....	...		78.4	...	....	.....	4778.3
2	n D	84.54	1	n D	84.78	...	nn D?	84.32	1	n D?	84.84	4784.5
1	n D	89.78	1–3	n D	89.67	1	n D	89.35	...	n D?	89.66	4789.5
...	....	.....	...	....	.....	max	B	94.37	...	B?	.....	4794.4
...	....	.....	...	....	.....	...	B	90.4	...	....	.....	4790.3
...	....	.....	...	....	.....	...		96.2	...	....	.....	4796.3
max	B	02.27	...	....	.....	...	....	.....	...	....	.....	4802.4
1–2	n D	06.89	...	wn D??	06.30	...	wn D	05.82	1	n D??	05.74	4806.2
1	n B?	11.34	...	....	.....	2	n B?	10.20	...	....	.....	4810.7
1	nn D	12.28	...	....	.....	1	n D	11.72	...	....	.....	4812.0
...	....	.....	...	B??	.....	2	n B?	13.92	...	....	.....	4814.0
3	wn D	16.06	1–3	n D??	15.93	...	....	.....	1–2	n D??	16.15	4815.9
...	B	(16.9)	...	....	.....	...	B	16.8	...	....	.....	4817.2
...		21.7	...	....	.....	...		22.1	...	....	.....	4822.3
...	nn D	24.02	1	n D?	23.96	1	n D	23.27	1–2	n D??	23.86	4823.8
4	n B	26.29	1–2	B??	26.05	2	n B?	25.69	...	B?	25.85	4826.0
...	....	.....	...	B	24.7	...	....	.....	...	B	24.7	482
...	....	.....	...		27.1	...	....	.....	...		26.9	
3	n D	28.31	2	n D?	28.19	1–2	n D	27.88	1–2	n D	27.90	4827.9
3–4	B	30.66	2–4	B	30.31	2–3	n B?	30.12	4–5	n B	30.56	4830.4
4–5	D	32.61	2–3	D	32.30	1–2	n D	32.48	4–6	D	32.46	4832.5
...	....	.....	...	....	.....	...	....	.....	...	....	.....	4836.3
1	nn D	40.27	0–1	n D??	39.45	...	....	.....	...	n D??	38.93	4839.5
...	....	.....	1	n D	43.50	...	....	.....	1–2	n D	43.48	4843.4
...	....	.....	...	....	.....	...	....	.....	1–2	n B	45.16	4845.2
...	....	.....	...	B	56.1	...	....	.....	...	con.	56.7	4856.4
...	....	.....	...		59.0	...	....	.....	...	spec.	59.1	4859.1
1	nn D	51.97	1	n D?	51.40	...	nn D?	51.87	1	nn D	51.91	4851.8
1–2	n D	55.73	...	nn D??	55.19	...	....	.....	...	....	.....	4855.5
2	n B	57.76	max	B??	57.77	...	....	.....	2–3	B	58.05	4857.7
1	nn D?	59.99	1	nn D??	59.29	...	....	.....	1	n D	59.65	4859.6
2	nn B	61.45	...	....	.....	max	B	61.46	1–2	n B??	60.72	4861.3

TABLE OF MEAN WAVE-LENGTHS CORRECTED FOR RADIAL VELOCITY—*Continued*

No.	280 *Schjellerup*			19 *Piscium*			318 *Birmingham*			74 *Schjellerup*		
	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length
			t.m.			t.m.			t.m.			t.m.
279	...	B	4860.1	...	....	.....	...	....	.....	...	....	.....
	...		4862.9	...	....	.....	...	....	.....	...	....	.....
280	3	n D	4865.11	...	....	.....	...	....	.....	1	nn D	66.1
281	3	nn D	(4865.11)	...	....	.....	...	....	.....	1	nn D	(66.11)
282	...	....	....	...	....	.....	...	....	.....	...	....	.....
283	...	....	....	...	....	.....	...	nn D?	71.83	1	n D	71.90
284	...	nn D	4875.27	...	....	.....	...	nn D	76.14	...	nn D	75.8
285	...	....	....	...	....	.....	...	....	.....	...	....	.....
286	max	B	(4878.53?)	...	B?	.....	...	....	.....	...	....	.....
287	...	B	4876.6	...	....	.....	...	....	.....	...	....	.....
	...		4880.5	...	....	.....	...	....	.....	...	....	.....
288	...	nn D?	4882.67	2–3	n D	81.69	3	n D	81.55	2–3	n D	81.75
289	...	....	....	...	....	.....	...	....	.....	...	....	.....
290	...	....	....	...	....	.....	...	....	.....	...	....	.....
291	...	....	....	...	....	.....	...	....	.....	...	....	.....
	...	....	....	...	....	.....	...	....	.....	...	....	.....
292	...	....	....	...	....	.....	...	....	.....	...	....	.....
293	...	nn D?	4890.03	...	....	.....	...	....	.....	1	w D	90.9
294	max	B	4898.14	...	....	.....	...	....	.....	max	B	98.88
295	...	B	4595.7	...	....	.....	...	....	.....	...	....	.....
	...		4899.8	...	....	.....	...	....	.....	...	....	.....
296	1–2	nn D	4900.70	2	nn D	00.81	2–3	n D	00.95	...	wn D	01.37
297	...	....	....	...	....	.....	...	....	.....	...	....	.....
298	...	....	....	...	....	.....	...	....	.....	...	....	.....
	...	....	....	...	....	.....	...	....	.....	...	....	.....
299	...	....	....	...	....	.....	...	....	.....	...	....	.....
300	...	....	....	...	....	.....	...	....	.....	...	....	.....
301	...	....	....	...	....	.....	...	....	.....	...	....	.....
302	...	nn D?	4920.65	1	n D	21.03	...	wn D	20.78	...	wn D	20.97
303	...	....	....	...	....	.....	...	....	.....	...	....	.....
	...	....	....	...	....	.....	...	....	.....	...	....	.....
304	...	....	....	1	n D?	24.91	1	nn D	25.24	...	....	.....
305	...	....	....	...	....	.....	1	D	34.47	...	w D?	34.14
306	...	....	....	...	....	.....	...	....	.....	...	....	.....
307	...	....	....	...	....	.....	1–2	n D	58.40	...	....	.....
308	...	....	....	...	....	.....	...	....	.....	...	....	.....
309	...	....	....	...	....	.....	...	....	.....	...	....	.....
310	...	head	5169.7	...	head	68.0	...	head	68.8	...	....	.....
311	...	....	....	...	....	.....	...	....	.....	...	....	.....
	...	....	....	...	....	.....	...	....	.....	...	....	.....
312	...	....	....	5	wD	73.57	...	....	.....	3–4	D	73.21
313	...	....	....	...	B??	.....	max	B	76.5	...	....	.....
314	...	....	....	...	....	.....	...	....	.....	...	....	.....
	...	....	....	...	....	.....	...	....	.....	...	....	.....
315	...	nn D	5183.83	4–5	D	83.65	...	nn D	83.72	...	....	.....
316	...	....	....	...	....	.....	...	....	.....	...	D	81.7
	...	....	....	...	....	.....	...	....	.....	...		85.5
317	...	....	....	1–2	B	87.31	...	....	.....	...	....	.....
318	...	....	....	...	....	.....	...	B	85.5	...	B??	85.5
	...	....	....	...	....	.....	...		91.7	...		91.4
319	...	....	....	...	....	.....	...	....	.....	...	....	.....
320	...	....	....	...	....	.....	...	....	.....	...	....	.....
321	2–3	n D	5193.81	3	D	93.06	...	....	.....	4	D	93.03
322	...	....	....	1–2	n B	97.10	...	....	.....	max	B	97.18
323	...	....	....	...	....	.....	...	....	.....	...	....	.....
324	...	....	....	1–2	n B??	04.02	...	....	.....	...	....	.....
325	...	....	....	...	....	.....	...	B	94.8	...	....	.....
	...	....	....	...	....	.....	...		04.5	...	....	.....
326	...	....	....	...	....	.....	...	....	.....	...	....	.....
327	...	....	....	...	w D	08.35	...	....	.....	...	....	.....
328	...	w D	5209.97	...	....	.....	...	....	.....	...	D	10.19
329	...	D	5204.3	...	....	.....	...	D	04.9	...	D	04.6
	...		5213.0	...	....	.....	...		11.7	...		11.1
330	...	....	....	3-4	B	14.63	...	....	.....	...	....	.....
331	...	....	....	1	n D	16.75	2	n D	16.53	...	D??	16.58
332	...	....	....	3	n B	18.75	...	....	.....	...	....	.....
333	...	....	....	...	....	.....	...	B	17.5	...	B	(12.2)
	...	....	....	...	....	.....	...		24.6	...		24.2
334	8	wn D	5226.19	6	wn D	26.19	6	wn D	26.33	6–8	wn D	26.17

TABLE OF MEAN WAVE-LENGTHS CORRECTED FOR RADIAL VELOCITY—*Continued*

78 *Schjellerup*			132 *Schjellerup*			115 *Schjellerup*			152 *Schjellerup*			MEAN WAVE-LENGTH
Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	
		t.m.			t.m.			t.m.			t.m.	t.m.
...	....	.....	...	....	.....	...	B	55.5	...	....	.....	486
...	....	.....	...	....	.....	...		65.8	...	....	.....	......
...	....	.....	...	....	.....	...	....	.....	1	nn D??	65.09	4865.1
...	....	.....	1	n D??	67.74	1–2	n D	67.43	...	nn D??	67.49	4867.7
1–2	B	69.82	3	n B??	69.26	...	....	.....	3	n B	68.97	4869.4
3	n D	71.57	2	n D??	71.43	...	....	.....	2–4	n D	71.32	4871.6
1–2	n D?	75.56	2–3	n D??	75.52	...	....	.....	2	n D	75.33	4875.6
...	....	.....	...	....	.....	...	....	.....	1	nn D??	78.32	4878.3
1–2	n B	79.81	5	wn B??	79.45	...	....	.....	2-3	n B	79.61	4879.6
...	....	.....	...	....	.....	...	....	.....	...	....	.....	487
...	....	.....	...	....	.....	...	....	.....	...	....	.....	
3	D	81.71	2–5	D	81.53	1	n D	81.09	4–7	D	81.52	4881.6
...	....	.....	...	....	.....	...	....	.....	4	n B	83.49	4883.5
...	....	.....	...	D??	.....	...	....	.....	3–5	n D	85.90	4886.0
...	....	.....	...	....	.....	...	....	.....	...	D	84.5	488
...	....	.....	...	....	.....	...	....	.....	...		87.3	
...	....	.....	...	....	.....	...	....	.....	2–3	n B	88.04	4888.0
...	nn D?	91.1	1–2	n D??	91.11	1–2	n D	89.88	1	n D	90.8	4890.3
3	nn B?	98.80	max	B??	98.90	...	....	.....	3–8	n B?	98.70	4898.7
...	....	.....	...	....	.....	...	B	93.2	...	B	92.2	4893
...	....	.....	...	....	.....	...		01.4	...		00.3	4900.5
1	n D	01.34	1–2	n D?	00.67	2	D	01.87	3	n D	01.18	4901.1
...	....	.....	...	....	.....	...	....	.....	5–6	n B?	03.78	4903.8
...	....	.....	...	....	.....	...	....	.....	...	B	02.3	490
...	....	.....	...	....	.....	...	....	.....	...		04.9	
...	....	.....	...	....	.....	...	....	.....	3–4	wn D?	06.41	4906.4
...	....	.....	...	B??	.....	...	....	.....	3–4	n B?	08.42	4908.4
...	....	.....	1	nn D?	09.83	...	....	.....	3	n D	10.59	4910.2
2–3	wn D	21.00	4	wn D??	20.52	1	nn D?	21.23	4–5	wn D??	20.54	4920.8
...	....	.....	...	D	19.1	...	....	.....	...	....	.....	491
...	....	.....	...		21.5	...	....	.....	...	....	.....	
1	n D?	25.39	1	n D??	25.03	1	n D	24.91	...	....	.....	4925.1
1	n D	33.81	2–3	n D	34.01	...	....	.....	...	....	.....	4934.1
...	....	.....	...	....	.....	...	....	.....	1–2	n D	45.60	4945.6
...	nn D?	57.60	2	n D??	58.05	...	....	.....	2	n D??	57.68	4957.9
...	....	.....	...	wn D	82.02	...	wn D	81.65	...	....	.....	4981.8
...	....	.....	...	....	.....	2	n D	67.24	...	....	.....	5167.2
...	....	.....	...	....	.....	...	head	68.2	...	head	67.6	5167.9
...	....	.....	...	B??	68.04	...	B?	68.2	...	....	.....	5167.9
...	....	.....	...	....	.....	...		72.8	...	....	.....	5172.8
6	wn D	73.30	3-4	n D	72.85	4	n D	73.79	8	D	73.27	5873.3
...	....	.....	...	....	.....	...	....	.....	2	B??	75.43	5175.4
...	....	.....	...	....	.....	...	B	75.0	...	....	.....	517
...	....	.....	...	....	.....	...		83.2	...	....	.....	
1	n D	83.94	...	w D	83.50	2–5	n D	83.61	5–6	n D	84.08	5183.8
...	....	.....	...	D	81.2	...	....	.....	...	....	.....	5181.5
...	....	.....	...		85.2	...	....	.....	...	....	.....	5185.4
...	....	.....	...	B?	.....	...	B	86.7	7	B	87.36	5187.3
...	....	.....	...	B	85.2	...	B	85.3	...	....	.....	5185.4
...	....	.....	...		91.9	...		92.2	...	....	.....	5191.8
1	n D	89.17	1	nn D??	89.23	1	n D?	89.43	2	D??	89.09	5189.2
...	....	.....	...	B?	.....	2	n B	90.80	7	B	90.97	5190.9
3	wn D	93.21	3	n D	93.04	...	n D	93.69	6	D	93.30	5193.3
...	....	.....	...	....	.....	...	....	.....	...	....	.....	5197.1
...	....	.....	...	D??	.....	...	....	.....	1	D	02.43	5202.4
...	....	.....	...	....	.....	...	....	.....	2	B??	03.85	5203.9
...	....	.....	...	B	94.3	...	B	95.8	...	....	.....	5194.9
...	....	.....	...		04.1	...		04.9	...	....	.....	5204.5
2	n D	05.84	...	....	.....	...	....	.....	2-3	n D	05.86	5205.8
...	....	.....	...	....	.....	...	....	.....	...	....	.....	5208.4
...	....	.....	...	....	.....	...	....	.....	...	....	.....	5210.1
...	....	.....	...	D	04.1	...	D	05.0	...	....	.....	5204.6
...	....	.....	...		11.8	...		13.0	...	....	.....	......
2	nn B?	14.22	...	B?	.....	4	n B	14.35	5	B??	14.41	5214.4
1–2	n D?	16.68	1	nn D??	16.52	...	nn D?	16.67	5	n D	16.84	5216.7
...	....	.....	...	B??	.....	...	....	.....	4	B??	19.12	5218.9
...	....	.....	...	....	.....	...	B	18.0	...	....	.....	......
...	....	.....	...	....	.....	...		25.0	...	....	.....	5224.6
9	wn D	26.35	5	D	27.28	8	nn D	26.78	5	D	26.98	5226.5

TABLE OF MEAN WAVE-LENGTHS CORRECTED FOR RADIAL VELOCITY—*Continued*

No.	280 *Schjellerup*			19 *Piscium*			318 *Birmingham*			74 *Schjellerup*		
	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length
			t.m.			t.m.			t.m.			t.m.
335	...	....	....	2	B??	·29 70	...	n B?	(29.81)	...	....	.....
336	...	....	....	...	....	.....	...	....	.....	...	B	28.8 33.3
337	...	n D	5234.33	3	D	34.27	2–3	D	34.22	2	n D	33.95
338	...	....	....	...	....	.....	...	....	.....	2	n B?	37.06
339	...	....	....	1	D	39.94	2	n D	39.69	...	nn D?	40.12
340	...	....	....	...	B??	.....	...	....	.....	2–3	nn B??	44.80
341	2	n D	5247.48	5	D	47.56	2	n D	47.34	3	n D	47.32
342	...	....	....	...	....	.....	...	....	.....	...	....	.....
343	1	n D	5251.3	5	D	51.44	2–3	n D	51.28	2	n D	51.66
344	...	....	....	1	n D?	55.96	2	nn D	55.60	...	....	.....
345	...	nn D?	5265.26	...	....	.....	...	....	.....	...	D?	65.75
346	4–5	n D	5270.62	6	D	70.46	5	n D	70.02	3	w D	70.17
347	...	....	....	2	n B??	79.59	2	n B??	79.68	...	....	.....
348	2–3	n D	5283.24	1–2	n D?	83.17	...	....	.....	1	n D	83.91
349	2	n D	5298.16	4–5	n D	98.19	4–5	n D	97.77	3	nn D	97.70
350	1	n D	5302.72	2	n D	02.76	1	nn D	02.24	1–2	n D	02.47
351	...	....	....	2-3	B	05.26	2–3	nn B	04.84	...	....	.....
352	...	nn D	5307.97	...	....	.....	...	....	.....	1	nn D	07.17
353	...	....	....	2	n B	13.22	3	n B	12.98	...	....	.....
354	...	nn D	5315.31	2	n D	15.27	2–3	n D	15.12	1–2	n D	15.30
355	...	....	....	4	n B	17.91	6	wn B	17.57	8	n B	17.50
356	...	nn D?	5320.95	2	n D	20.99	2	n D	(20.61)	...	....	.....
357	...	....	....	1	n D??	25.32	...	....	.....	...	....	.....
358	...	w D	5329.80	5	w D	29.03	4	D	28.70	2–3	n D	29.00
359	...	nn D?	5337.05	1–2	n D	36.94	1	n D	36.83	2	n D	36.65
360	...	....	....	3	n B	39.36	3	B?	39.05	4	n B??	38.70
361	1	n D	5341.84	2	D	41.30	4	D	41.25	2	n D	41.35
362	...	....	....	...	....	.....	...	....	.....	...	....	.....
363	3–4	D	5350.43	3	wn D	50.07	...	....	.....	2	n D	49.83
364	2	B	5353.37	2	n B	52.71	...	....	.....	...	....	.....
365	...	....	....	...	....	.....	...	B	51.1 61.1	...	....	.....
366	...	....	....	1	D	62.99	...	....	.....	...	nn D	61.89
367	...	....	....	2	n D	66.94	2	n D	66.47	1	D	66.35
368	...	....	....	2	B	68.78	3–4	n B	68.68	...	....	.....
369	9	w D	5372.07	8–9	w D	71.70	6	D	71.50	6	w D	71.52
370	...	....	....	...	....	.....	...	....	.....	...	....	.....
371	2–3	B	5375.22	6	B	75.38	7	n B	74.92	8	n B	74.76
372	...	nn D	5377.48	1–2	D	77.58	2	n D	77.36	2	n D	77.38
373	...	....	....	...	....	.....	...	....	.....	...	....	.....
374	max	B	5380.54	2	n B	79.82	6–8	n B	79.72	6	n B	79.91
375	...	....	....	...	....	.....	...	....	.....	...	....	.....
376	...	B?	5378.0 5381.5	...	....	.....	...	....	.....	...	....	.....
377	...	....	....	...	....	.....	...	....	.....	...	nn D?	84.69
378	...	nn D	5391.56	1	n D	91.09	...	....	.....	...	D??	.....
379	...	....	....	...	B?	.....	...	....	.....	3	n B?	93.01
380	...	....	....	...	....	.....	...	....	.....	...	....	.....
381	5	D	5397.47	3	D	97.58	4	wn D	96.81	3	n D	97.28
382	...	....	....	2	B	04.06	max	B	03.72	...	....	.....
383	...	B	5399.9 5405.7	...	....	.....	...	....	.....	...	B	98.8 05.3
384	...	D?	5406.26	1	n D	06.43	...	....	.....	1	n D	06.28
385	...	....	....	...	....	.....	...	....	.....	...	....	.....
386	1	B?	5408.34	...	....	.....	...	....	.....	...	....	.....
387	3	n D	5410.55	3	D	10.28	1	n D	10.37	3–4	n D	10.31
388	...	....	....	1–2	B	12.64	1	B	12.46	1	n B	12.32
389	...	....	....	1	D	14.45	1	n D	13.91	...	....	.....
390	max	B	5418.34	7	B	17.29	...	w B	16.64	6	B	17.01
391	...	B	5413.5 5419.1	...	....	.....	...	....	.....	...	....	.....
392	2–3	n D	5420.44	2–3	n D	20.17	2–3	n D	20.22	3–4	n D	19.66
393	1–2	B??	5423.39	4	B	23.23	6	B	22.78	2–3	B	22.97
394	1	D	5425.90	1	D	25.24	1	nn D	24.82	...	....	.....
395	1–2	B?	5427.39	3–4	B	27.99	5	n B?	(26.67)	2	n B	27.09
396	...	n D	5430.33	3	D	30.39	4	n D	30.13	3–4	n D	29.87

TABLE OF MEAN WAVE-LENGTHS CORRECTED FOR RADIAL VELOCITY—*Continued*

78 *Schjellerup*			132 *Schjellerup*			115 *Schjellerup*			152 *Schjellerup*			MEAN WAVE-LENGTH
Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	
		t.m.			t.m.			t.m.			t.m.	t.m.
...	....	.....	...	....	.....	...	B	30.73	6	B??	30.23	5229.2
...	....	.....	...	....	.....	...	B	28.6	...	....	.....	5228.7
...	....	.....	...	....	.....	...		32.6	...	....	.....	5233.0
3-4	n D	33.97	3	n D	33.91	2-3	n D	33.99	5	D	33.44	5234.0
...	....	.....	max	B	36.52	6	wn B	36.70	10	B	36.22	5236.6
...	....	.....	1	n D??	39.79	...	nn D	39.96	1-2	n D??	38.98	5239.8
...	....	.....	...	B??	.....	3	wn B	44.70	3	B??	44.87	5244.8
5	n D	47.43	3	n D	47.41	3	nn D	47.19	6	D	47.21	5247.4
...	....	.....	...	....	.....	...	....	.....	5	B?	49.22	5249.2
3	n D	51.47	3	D	51.46	...	nn D	51.83	8	D	51.31	5251.5
1	nn D?	55.25	1	n D	55.60	...	....	.....	2	D	55.31	5255.5
...	....	.....	...	....	.....	...	....	.....	1	D	66.22	5265.7
3	n D	70.55	4-5	D	70.41	5	n D	70.75	5	D	70.05	5270.4
2	nn B?	79.75	1-2	B??	79.46	...	nn B?	80.10	2	n B?	79.47	5279.7
1	nn D	83.43	1	nn D??	83.90	...	....	.....	1-2	n D	84.33	5283.7
4	n D	97.63	3	D	98.11	2-3	D	98.37	2	n D	97.40	5298.0
2	n D	02.14	1	n D??	02.35	...	....	.....	...	....	.....	5302.4
2	n B	04.97	...	B?	.....	...	nn B	05.13	...	B?	.....	5305.1
1	nn D	07.44	...	....	.....	...	....	.....	...	....	.....	5307.5
2-3	n B	13.07	1	B?	13.43	4	n B	13.13	4	B	13.20	5313.2
2-3	n D	15.09	1-2	n D	15.28	3	n D	15.30	3	D	15.40	5315.3
4	n B	17.58	2	B?	17.76	9	n B	17.81	1-2	B??	17.36	5317.6
...	nn D?	20.19	3	wn D??	21.13	3	nn D	20.71	...	....	.....	5320.8
...	....	.....	...	....	.....	...	....	.....	1	D	25.21	5325.3
3	n D	29.00	4	n D	29.06	...	....	.....	3	D	28.54	5329.0
1-2	n D	36.86	1	n D	36.82	4	n D	36.97	1-2	n D	37.30	5336.9
4	n B??	39.12	...	B??	.....	6	n B	39.29	7	B	39.37	5339.1
2	D	41.59	2-3	n D	41.63	3	n D	41.78	7	D	41.61	5341.5
1	nn B?	44.64	...	....	.....	...	nn B	44.71	6	B	44.31	5344.6
2-3	wn D	49.57	...	....	.....	...	....	.....	...	....	.....	5350.0
1	n B	52.23	1	B??	52.52	4	n B	52.39	3-4	B??	52.25	5352.6
...	....	.....	...	....	.....	...	B	55.4	...	....	.....	535
...	....	.....	...	....	.....	...		64.8	...	....	.....	
...	....	.....	1	n D	62.99	...	....	.....	1	n D	62.50	5362.6
...	nn D	66.51	1-2	n D	66.72	1-2	n D	65.99	3-4	D	66.70	5366.5
3	n B	68.93	2	B	69.05	3	n B	68.71	10	B	69.11	5368.9
6	D	71.68	10	w D	71.89	7	wn D	71.64	9	D	72.10	5371.8
...	....	.....	...	....	.....	...	D	70.1	...	....	.....	537
...	....	.....	...	....	.....	...		73.7	...	....	.....	
4-5	B	75.05	4-5	B	75.15	8	B	75.01	8	B	74.98	5375.1
2	n D	77.38	1	n D	77.44	3	n D	77.29	4	D	77.07	5377.4
...	....	.....	...	....	.....	...	....	.....	3	B	78.92	5378.9
5-6	wn B	80.47	3	n B??	80.46	9	wn B	80.68	...	B	79.91	5380.2
...	....	.....	...	....	.....	...	....	.....	3	n B	81.44	5381.4
...	....	.....	...	....	.....	...	B	78.5	...	....	.....	5378.3
...	....	.....	...	....	.....	...		82.1	...	....	82.9	5382.2
...	wn D	84.87	1	n D	84.55	...	....	.....	...	....	.....	5384.7
1	nn D	90.40	...	D?	.....	...	....	.....	...	....	.....	5391.0
...	....	.....	...	....	.....	4-5	wn B??	93.21	...	....	.....	5393.1
...	....	.....	...	....	.....	...	B	87.5	...	....	.....	538
...	....	.....	...	....	.....	...		94.1	...	....	.....	
9	wn D	96.91	1	nn D	97.97	3	wn D	96.75	3	D	97.88	5397.3
...	....	.....	...	....	.....	...	....	.....	1-2	n D??	03.50	5403.8
...	....	.....	...	....	.....	...	B	99.0	...	....	.....	5399.4
...	....	.....	...	....	.....	...		08.0	...	....	.....	5405.5
...	....	.....	1	nn D	06.90	...	....	.....	...	....	.....	5406.5
...	....	.....	...	....	.....	...	....	.....	2-3	wn D	08.30	5408.3
...	....	.....	...	....	.....	...	....	.....	...	B?	.....	5408.3
2	nn D	10.01	2	n D	10.59	3	n D	09.80	...	....	.....	5410.3
...	....	.....	1-2	B	12.39	3	n B	12.30	...	....	.....	5412.4
1	n D	14.40	1-2	n D??	14.09	1-2	n D	13.80	1-2	n D??	14.06	5414.1
7-8	n B	17.28	4-5	B	17.06	7-8	wn B	17.00	...	....	.....	5417.2
...	....	.....	...	....	.....	...	....	.....	...	....	.....	541
...	....	.....	...	....	.....	...	....	.....	...	....	.....	
3	n D	20.53	4	D	20.43	3	nn D?	20.49	2	n D	20.13	5420.3
2	n B	23.13	3	n B	23.05	3	n B	23.45	3	n B	22.50	5423.1
...	....	.....	1-2	n D	25.03	...	nn D?	25.36	1	n D	24.41	5425.1
...	....	.....	...	....	.....	3	n B	27.18	...	....	.....	5427.4
3	n D	30.27	3-4	D	30.33	3	D	30.17	2	D	30.24	5430.2

TABLE OF MEAN WAVE-LENGTHS CORRECTED FOR RADIAL VELOCITY—*Continued*

No.	280 *Schjellerup*			19 *Piscium*			318 *Birmingham*			74 *Schjellerup*		
	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length
			t.m.			t.m.			t.m.			t.m.
397	1	n B	5432.68	2	B	32.38	2	B	32.13	1	n B	32.14
398	2	n D	5434.66	1–2	D	34.20	1–2	D	33.99	2	n D	34.25
399	2	D??	5439.06	1	D	38.86	1	nn D?	38.06	...	....	.....
400	...	....	....	...	....	.....	...	....	.....	...	....	.....
401	...	....	....	4	B	45.19	...	....	.....	...	....	.....
402	... ...	B	5440.7 5446.5	... ...	....	....	... ...	B	39.2 45.7	... ...	B	38.6 46.1
403	4	n D	5448.31	6	D	48.09	7–8	n D	47.72	5	n D	47.94
404	6	w B	5452.64	3	B	51.05	5	B	50.60	...	....	.....
405	...	....	....	3	B	53.85	3	n B??	(53.02)	...	....	.....
406	... ...	B	5450.3 5455.0	... ...	....	....	... ...	....	....	... ...	....	....
407	4	n D	5456.54	3	D	56.96	2	n D	56.43	2–3	n D	56.54
408	1–2	B	5459.07	2	B	59.14	1	B	58.92	1–2	B	58.63
409	2	D	5461.13	2	D	60.99	2	n D	60.84	2	D	60.49
410	...	....	....	...	B	62.96	2	B	62.60	...	....	.....
411	2–3	B??	5464.01	3–4	B	63.76	2	B	.....	...	....	.....
412	...	....	....	...	B	65.15	...	....	.....	...	....	.....
413	... ...	....	....	... ...	....	....	... ...	B	61.3 65.7	... ...	B	61.4 66.2
414	1	n D	5466.93	2	n D	67.83	2	n D	67.06	...	w D	67.60
415	... ...	....	....	... ...	D??	....	... ...	D?	65.7 70.3	... ...	....	....
416	...	....	....	2–3	B	72.43	6	B	72.10	3	n B	71.77
417	1	n D	5475.08	1–2	n D	74.56	2	n D	74.38	2	nn D	74.33
418	...	....	....	1–2	n D??	78.09	2	n D??	77.56	1	n D	77.89
419	...	....	....	4	B	80.89	2–3	n B	(80.03)	4	n B?	80.25
420	1	nn D??	5483.08	2	D	82.73	1	n D	83.05	1–2	nn D	82.64
421	...	....	....	...	....	.....	...	....	.....	...	....	.....
422	...	....	....	...	B??	.....	...	....	.....	...	....	.....
423	...	....	....	3–4	D	98.13	...	....	.....	3	n D	97.75
424	...	....	....	...	....	.....	...	....	.....	2	n D	01.81
425	... ...	....	....	... ...	....	....	... ...	....	....	... ...	....	....
426	...	....	....	...	head	03.1	...	....	.....	...	....	.....
427	1	n D	5507.19	1	D??	07.18	0–1	nn D	07.06	1	n D	06.66
428	...	....	....	2–3	n B	09.51	...	....	.....	2	n B?	08.64
429	4	n B??	5510.00	2	B	10.72	...	....	.....	...	....	.....
430	... ...	con. spec.	5508.6 5512.9	... ...	....	....	... ...	....	....	... ...	....	....
431	...	....	....	1–2	n D??	12.70	...	....	.....	2	nn D	12.28
432	... ...	D	5512.4 5517.9	... ...	....	....	... ...	....	....	... ...	....	....
433	... ...	con. spec.	5518.2 5527.8	... ...	....	....	... ...	B	13.8 23.0	... ...	....	....
434	...	....	....	1	n D	24.44	2	n D	24.35	1	wn D	24.19
435	...	....	....	...	....	.....	...	....	.....	...	....	.....
436	2	n D	5528.85	1	D??	28.28	1	nn D??	29.09	...	....	.....
437	2	n B?	5531.66	2	B	31.96	...	....	.....	...	....	.....
438	1	n D?	5533.79	1	D	33.87	1	n D	33.89	1	n D	33.66
439	...	....	....	7	wn D	39.73	8–9	n D	39.22	8	wn D	39.25
440	... ...	D	5537.4 5542.4	... ...	....	....	... ...	....	....	... ...	....	....
441	...	....	....	...	head	41.8	...	head	41.4	...	....	.....
442	...	....	....	4	B?	43.44	...	....	.....	1–2	B	43.57
443	... ...	....	....	... ...	B	41.8	... ...	B	41.4 47.0	... ...	....	....
444	...	....	....	...	....	.....	...	....	.....	...	....	.....
445	...	....	....	1	D	48.34	1–2	n D	48.31	...	....	.....
446	...	....	....	1	D??	52.42	1	n D	52.53	1	nn D	52.20
447	max	n B	5554.54	3	B	54.29	2	n B	54.35	1	n B?	53.91
448	...	nn D?	5557.27	1	D	56.32	1–2	n D	56.28	1	n D	55.80
449	...	....	....	1–2	D	62.55	1–2	n D	62.68	...	....	.....
450	...	....	....	2–3	B	64.49	2	n B	64.70	1–2	B	64.73
451	...	nn D	5567.60	2	D	66.60	1–2	n D	66.86	2	n D	66.57
452	...	....	....	1	D	70.29	1	n D	70.16	0-1	nn D	69.96
453	...	n B?	5572.04	1	B	71.85	...	....	.....	...	....	.....
454	... ...	....	....	... ...	....	....	... ...	....	....	... ...	....	....

TABLE OF MEAN WAVE-LENGTHS CORRECTED FOR RADIAL VELOCITY—*Continued*

78 *Schjellerup*			132 *Schjellerup*			115 *Schjellerup*			152 *Schjellerup*			Mean Wave-Length
Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	
		t.m.			t.m.			t.m.			t.m.	t.m.
...	....	.....	3	B	32.25	1	n B?	32.15	2	B??	32.23	5432.3
2	n D	34.57	1–2	D??	34.35	...	....	.....	1–2	n D	34.35	5434.3
...	....	.....	...	D??	.....	...	....	.....	2	D	38.93	5438.6
max	B	42.54	...	B??	.....	...	....	.....	3	n B	42.70	5442.6
...	....	.....	...	B??	.....	...	....	.....	...	....	.....	5445.2
...	B	39.7	...	....	.....	...	B	40.3	...	....	.....	5439.8
...		46.0	...	....	.....	...		44.9	...	....	.....	5446.0
9	n D	47.62	8	n D	47.73	7	n D	47.54	...	w D	47.06	5447.8
max	B	51.08	max	B	50.91	4–5	B	50.89	4	B	50.90	5450.9
...	....	.....	...	....	.....	...	....	.....	...	....	.....	5453.9
...	B	49.0	...	....	.....	...	....	.....	...	....	.....	5449.7
...		55.1	...	....	.....	...	....	.....	...	....	.....	5455.0
1–2	n D	56.81	3	n D	56.92	2	nn D	56.46	1	nn D	57.13	5456.7
...	....	.....	...	....	.....	1	n B?	58.88	...	....	.....	5458.9
1–2	n D	60.96	1–2	n D	60.99	1	n D	60.80	1	nn D	61.18	5460.9
...	....	.....	...	....	.....	...	....	.....	...	....	.....	5462.8
...	....	.....	..	B?	.....	...	....	.....	...	....	.....	5463.9
...	....	.....	...	....	.....	...	....	.....	...	....	.....	5465.2
...	....	.....	...	....	.....	...	....	.....	...	....	.....	5461.4
...	....	.....	...	....	.....	...	....	.....	...	....	.....	5466.0
2	wn D	68.30	1	n D	66.75	...	....	.....	...	....	.....	5467.4
...	....	.....	...	....	.....	...	....	.....	...	....	.....	546
...	....	.....	...	....	.....	...	....	.....	...	....	.....	
2	n B	72.63	3	B?	72.40	5	B	72.31	...	....	.....	5472.3
1	nn D?	74.46	1	n D?	74.20	1–2	n D	74.34	1	D	74.35	5474.5
1	nn D?	78.25	1–2	n D??	78.04	...	....	.....	...	....	.....	5478.0
...	....	.....	...	B??	.....	...	nn B?	80.91	1	B?	81.58	5480.9
1	n D	83.19	1	n D	82.99	...	nn D	83.60	...	....	.....	5483.0
...	....	.....	...	....	.....	...	nn B	86.18	1	B?	87.03	5486.6
...	....	.....	1–2	n B?	95.65	...	....	.....	...	....	.....	5495.7
3–4	D	98.22	5	D	97.92	...	....	.....	...	....	.....	5498.0
...	....	.....	4	n D	02.31	...	....	.....	...	....	.....	5502.1
...	D	96.8	...	....	.....	...	....	.....	...	....	.....	550
...		03.9	...	....	.....	...	....	.....	...	....	.....	
...	head	03.8	...	....	.....	...	head	05.0	...	....	.....	5504.
...	....	.....	1	n D??	06.89	...	....	.....	...	....	.....	5507.0
3	n B	09.59	2	wn B?	08.88	...	....	.....	5–6	B	08.30	5509.0
...	....	.....	...	....	.....	...	....	.....	...	....	.....	5510.4
...	....	.....	...	....	.....	...	B?	05.0	...	....	.....	550
...	....	.....	...	....	.....	...		10.4	...	....	.....	551
3	n D	12.44	2	nn D	12.46	2	nn D	12.20	...	....	.....	5512.4
...	....	.....	...	....	.....	...	....	.....	...	....	.....	551
...	....	.....	...	....	.....	...	....	.....	...	....	.....	
...	....	.....	...	con.	13.9	...	B?	14.5	...	....	.....	5514.
...	....	.....	...	spec.	23.2	...		23.4	...	....	.....	552
...	....	.....	1	n D	24.36	...	nn D	23.95	...	....	.....	5524.3
1–2	wn D	25.45	...	....	.....	2	n D	25.25	...	....	.....	5525.4
...	....	.....	1	nn D??	28.09	...	....	.....	...	....	.....	5528.6
...	....	.....	...	....	.....	...	....	.....	...	....	.....	5531.7
1	nn D?	(34.62)	1	n D	33.86	1	n D	33.96	1–2	wn D	32.6	5533.9
7	D	39.55	8	D	39.81	8	D	39.54	2–3	wn D	39.31	5539.5
...	....	.....	...	....	.....	...	....	.....	...	....	.....	553
...	....	.....	...	....	.....	...	....	.....	...	....	.....	
...	head	42.1	...	....	.....	...	head	41.8	...	....	.....	5541.8
...	....	.....	2–3	n B?	43.61	...	....	.....	...	....	.....	5543.5
...	B	42.1	...	B	44.6	...	B	41.8	...	...	.....	5541.8
...		47.3	...		46.7	...		46.7	...	....	.....	5546.9
...	....	.....	...	....	.....	...	....	.....	1–2	w D	46.56	5546.6
2	n D	48.60	1–2	D	48.03	2–3	n D	48.45	...	....	.....	5548.3
1	n D	52.45	...	....	.....	1–2	D	52.80	1	D	52.64	5552.5
...	....	.....	...	....	.....	2	n B	54.48	...	....	.....	5554.3
1	n D	56.38	1	n D	56.30	2	n D	56.36	1	n D	56.24	5556.4
1	n D	62.76	1	nn D	62.20	1	n D?	62.40	1	n D	62.50	5562.5
...	....	.....	1–2	n B?	64.54	1–2	n B	64.87	...	....	.....	5564.7
1–2	n D	67.23	1	n D	66.84	...	n D?	67.42	4	n D	68.08	5567.2
1	n D	70.36	...	....	.....	...	....	.....	...	....	.....	5570.2
...	....	.....	2	B	71.66	max	B	71.24	...	....	.....	5571.7
...	B	55.	...	....	.....	...	....	67.7	...	....	.....	556.00
...		73.6	...	....	.....	...	B	73.1	...	....	.....	

TABLE OF MEAN WAVE-LENGTHS CORRECTED FOR RADIAL VELOCITY—*Continued*

No.	280 *Schjellerup*			19 *Piscium*			318 *Birmingham*			74 *Schjellerup*		
	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length
			t.m.			t.m.			t.m.			t.m.
455	...	...	...	1	D	73.57	1	D?	73.9	1	D	73.41
456	...	...	...	...	...	...	...	...	...	...	D??	...
457	1–2	n D	5584.65	8–9	D	83.98	9–10	w D	83.70	9	...	83.98
458	... ...	... ...	... ...	... ...	D	... 85.8	... ...	... ...	... ...	... ...	... ...	... ...
459	...	...	...	...	head	85.8	...	head	85.6	...	...	...
460	2	n B	5587.54	4	B	86.95	5	B	86.96	4	B	86.89
461	1–2	n D	5589.99	1–2	n D	89.32	1	D	89.14	1	n D	88.97
462	...	...	...	...	...	...	...	...	...	...	...	...
463	1	n B	5593.21	1–2	n B	92.27	1	n B	92.53	...	...	...
464	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...
465	...	...	...	1	n D	94.51	1	n D	94.40	1	n D	94.62
466	2	n B?	5597.94	4	B	97.51	6–7	B	97.55	4	wn B	97.37
467	...	...	...	1	n D?	99.60	1	n D	99.81	1	nn D	99.58
468	...	...	...	2	n D??	09.33	...	wn D	09.74	2	n D	09.49
469	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...
470	...	...	...	1	n D	15.56	...	...	...	...	...	...
471	...	...	...	2	B??	17.38	2	B	17.42	...	...	...
472	3	D	5620.92	2	D	20.07	...	nn D	20.31	3–4	D	20.20
473	4	D	5625.96	3	n D	24.71	5	n D	24.68	5	wn D	24.78
474	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...	D	18.5 26.1
475	...	...	...	1–2	B?	27.70	1	n B	27.76	...	...	...
476	...	...	...	...	...	...	...	...	...	...	...	...
477	6	B??	5630.26	2	B?	30.69	1	n B?	30.54	...	...	...
478	... ...	B	5627.9 5632.0	... ...	... ...	... ...	... ...	B	26.1 31.2	... ...	B?	26.6 32.2
479	7	D	5634.05	10	D	34.21	10	w D	34.11	10	w D	34.20
480	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...
481	...	head	5636.78	...	head	36.23	...	head	37.13	...	head	36.68
482	...	...	...	3	B	37.59	2	n B	37.99	...	...	...
483	...	...	...	3	B	41.12	...	...	...	2	n B	41.33
484	... ...	... ...	... ...	... ...	... ...	... ...	... ...	B	37.1 42.3	... ...	... ...	... ...
485	...	nn D	5645.22	1	n D	44.07	1	n D	43.74	2	n D	43.71
486	...	...	...	2	n B??	46.75	...	...	...	...	...	...
487	1	n D?	5650.18	1	D??	49.88	...	...	...	1	nn D	49.85
488	...	...	...	2–3	B	53.00	...	...	...	...	...	...
489	...	...	...	3	B??	55.10	max	B	55.42	...	...	...
490	... ...	B	5651.3 5657.2	... ...	... ...	... ...	... ...	B	45.1 56.4	... ...	B	44.8 57.2
491	1–2	n D	5658.23	2	D	58.60	...	...	...	3	n D	58.25
492	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...
493	1	n D	5671.71	1	D	70.83	1	n D	71.44	4	wn D	71.26
494	1	B?	5674.74	3	B??	73.75	4	n B	73.59	2	B?	74.35
495	...	...	...	...	...	...	...	...	...	...	...	...
496	1–2	D	5677.33	1–2	D	76.41	1	n D	76.76	2	wn D	76.74
497	...	...	...	1	n B	79.21	...	...	...	1	B	79.24
498	...	...	...	1	n B	84.29	...	...	...	...	...	...
499	1–2	nn D	(5687.93)	1	n D	87.11	1	D?	(88.0)	1	nn D	86.89
500	...	wn B	5694.41	3	B	93.78	...	wn B	93.89	6	n B	93.62
501	...	...	...	1	D	96.82	1	n D	97.24	...	...	...
502	...	...	...	...	...	...	...	...	...	0–1	B?	00.26
503	2	nn B	5706.71	3–4	B	05.41	5	n B	05.42	3	B	05.25
504	1–2	n D	5708.92	2	D	08.26	4	n D	08.49	2	n D	08.44
505	...	...	...	2	B	10.45	2	n B??	10.81	1	B	11.05
506	...	...	...	1	D	12.94	2	n D	12.94	2	n D	12.88
507	...	...	...	1	B	15.00	...	...	...	...	...	...
508	...	nn B	5717.37	4	B	17.05	...	...	...	4	wn B	17.19
509	...	...	...	4	B	17.87	...	...	...	...	...	...
510	... ...	... ...	... ...	... ...	... ...	... ...	... ...	B	14.5 20.2	... ...	... ...	... ...
511	...	...	...	1	n D	21.40	1	n D	21.95	2	n D	21.23
512	2	n B	5724.44	4	B	24.12	4	n B	24.27	3	n B	24.07
513	...	nn D	5731.70	2	n D	31.20	3	n D	31.56	2	n D	31.76

TABLE OF MEAN WAVE-LENGTHS CORRECTED FOR RADIAL VELOCITY—*Continued*

78 *Schjellerup*			132 *Schjellerup*			115 *Schjellerup*			152 *Schjellerup*			Mean Wave-Length
Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	
		t.m.			t.m.			t.m.			t.m.	t.m.
1	n D	74.45	1	nn D?	73.4	...	....	.....	...	....	.....	5573.7
...	....	.....	1	n D??	76.50	...	....	.....	8	w D	76.16	5576.3
max	D	84.02	9	D	83.86	9	D	83.83	10	w D	83.69	5584.0
...	D	73.6	...	....	.....	...	D	81.9	...	....	.....	5581.9
...		85.9	...	....	.....	...		85.9	...	....	.....	5585.9
...	head	86.03	...	....	.....	...	head	86.21	...	....	.....	5586.0
3	B	87.23	3	B	86.97	6	B	87.66	1	B?	87.57	5587.2
1	n D	89.27	1	n D	88.90	...	....	.....	1	D	88.95	5589.2
...	....	.....	...	....	.....	...	....	.....	10	B?	91.44	5591.4
2–3	n B	92.10	1	n B	91.82	8	B	92.35	2	B	92.58	5592.4
...	....	.....	...	B?	.....	...	B	86.2	...	....	.....	558
...	....	.....	...		.....	...		93.5	...	....	.....	
2	n D	94.98	1	n D	94.41	...	n D	95.10	...	....	.....	5594.7
4	B	97.61	2	n B	96.89	4	n B	97.67	...	....	.....	5597.5
1–2	nn D	00.38	1–2	nn D	00.17	1	n D	00.03	...	....	.....	5599.9
...	nn D	09.52	1–2	nn D	09.05	...	wn D	09.83	...	....	.....	5609.5
...	D	07.6	...	....	.....	...	D	08.1	...	D	06.9	5607.5
...		12.1	...	....	.....	...		12.2	...		16.0	5612.2
...	....	.....	1	n D	15.42	...	....	.....	1	D	16.09	5615.7
...	....	.....	1–2	n B?	17.11	...	....	.....	...	....	.....	5617.3
2	n D	20.18	3	n D	20.00	...	nn D?	20.17	...	....	.....	5620.3
...	nn D	25.38	4	n D	24.61	...	nn D	25.64	...	....	.....	5625.1
...	D	18.6	...	D	.....	...	....	.....	...	D	18.8	5618.6
...		27.1	...		26.6	...	....	.....	...		25.4	5626.2
...	....	.....	...	B??	26.5	...	....	.....	...	....	.....	5627.7
...	....	.....	...	....	.....	...	....	.....	...	w B??	29.00	5629.0
...	....	.....	...	....	.....	...	....	.....	...	....	.....	5630.5
...	....	.....	...	con.	26.50	...	B	27.4	...	....	.....	5626.9
...	....	.....	...	spec.	31.40	...		32.3	...	....	.....	5631.8
10	D	34.23	10	D	33.79	10	D	34.58	10	w D	33.76	5634.1
...	....	.....	...	....	.....	...	D	32.3	...	....	.....	5630
...	....	.....	...	....	.....	...		37.6	...	....	.....	
...	head	36.79	...	head	36.60	...	head	37.49	...	head	36.11	5636.9
8	n B	38.64	2–3	n B	37.87	...	....	.....	6	B	38.06	5638.0
6	B	41.65	2–3	n B	40.74	...	....	.....	4	B	41.46	5641.3
...	B	36.8	...	....	.....	...	B	37.6	...	....	.....	5637.2
...		42.5	...	....	.....	...		43.6	...	....	.....	5642.8
2	n D	44.29	...	wn D	43.89	...	nn D	45.20	1	n D	44.57	5644.3
...	....	.....	1–2	n B?	46.15	...	n B	46.21	...	....	.....	5646.4
1	nn D	50.24	...	....	.....	...	....	.....	...	....	.....	5650.2
...	....	.....	...	....	.....	...	....	.....	...	....	.....	5653.0
2	n B?	55.24	1	n B?	55.42	max	B	55.30	...	....	.....	5655.2
...	....	.....	...	....	.....	...	B	46.3	...	....	.....	5645.4
...	....	.....	...	....	.....	...		56.7	...	....	.....	5656.9
1	nn D	57.63	1	n D	57.93	...	nn D	58.05	0–1	D	57.32	5658.0
...	....	.....	...	....	.....	...	B	59.2	...	....	.....	565
...	....	.....	...	....	.....	...		70.4	...	....	.....	
3	n D	71.34	1	nn D	70.99	1–2	n D	71.68	1	nn D	71.22	5671.3
2	n B?	73.93	...	B??	.....	2	n B	74.3	...	....	.....	5674.1
...	....	.....	...	....	.....	...	....	.....	...	....	.....	5675.5
2	n D	76.47	1	n D	76.48	1	n D	76.67	...	....	.....	5676.7
2	n B?	79.45	...	B??	.....	2	n B	79.96	2	B	79.49	5679.5
1–2	n B?	83.81	...	....	.....	2	n B	84.21	...	....	.....	5684.1
2	n D	86.53	1	n D	86.29	...	....	.....	4	D	86.59	5686.6
8	wn B	93.79	4	B	93.21	8	n B	94.16	5	B	93.17	5693.8
1	nn D	96.33	1	nn D	96.72	1	n D?	97.18	1	D	95.80	5696.7
...	....	.....	...	....	.....	2	n B	99	...	B??	.....	5699.8
5	n B	05.05	3	B	04.53	6	n B	05.14	1–2	B	04.97	5705.3
3–4	n D	08.03	2	n D	08.23	1	n D?	08.09	2	D	07.89	5708.3
...	....	.....	1	B??	10.71	...	....	.....	...	B??	.....	5710.8
1	n D	13.19	1–2	n D	12.33	1	n D?	13.12	1	n D	12.49	5712.8
...	....	.....	...	....	.....	...	....	.....	...	....	.....	5715.0
8	wn B	17.23	5	nn B?	16.31	8	n B	17.17	8	B	16.49	5717.0
...	....	.....	...	....	.....	...	....	.....	...	....	.....	5717.9
...	....	.....	...	B	14.1	...	....	.....	...	....	.....	5714.3
...	....	.....	...		19.6	...	....	.....	...	....	.....	5719.9
2	n D	21.46	1	n D	21.5	...	....	.....	4	n D	20.68	5721.4
6	wn B	24.28	3	n B?	24.00	8	n B	24.86	6	B	23.80	5724.2
8	n D	31.48	3	D	30.72	2	n D	31.97	6	w D	31.60	5731.6

TABLE OF MEAN WAVE-LENGTHS CORRECTED FOR RADIAL VELOCITY—*Continued*

No.	280 *Schjellerup*			19 *Piscium*			318 *Birmingham*			74 *Schjellerup*		
	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length
			t.m.			t.m.			t.m.			t.m.
514	...	....	....	...	....	.....	...	....	.....	...	D	26.6
	...	....	....	...	....	.....	...	....	.....	...		33.4
515	...	B	5734.2	...	....	.....	...	B	33.8	...	....	.....
	...		5743.1	...	....	.....	...		41.7	...	....	.....
516	...	nn D	5744.32	2	n D	44.35	...	nn D	43.89	1	nn D?	43.96
517	...	....	....	1	n B??	47.09	...	....	.....	...	....	.....
518	...	....	....	1	n D	49.59	...	nn D	49.73	...	....	.....
519	...	....	....	...	....	.....	...	....	.....	...	....	.....
	...	....	....	...	....	.....	...	....	.....	...	....	.....
520	1	n D	5751.70	...	....	.....	...	....	.....	...	....	.....
521	2-3	wn B	5758.05	3	n B	57.02	max	B	57.08	...	....	.....
522	...	....	....	...	....	.....	...	....	.....	...	....	.....
	...	....	....	...	....	.....	...	....	.....	...	....	.....
523	...	wn D	5763.7	2	n D	62.53	...	nn D	62.53	1	n D	63.66
524	2	n B	5768.79	2	n B?	67.29	...	....	.....	...	....	.....
525	1	n D	5772.1	2	n D	71.19	...	nn D	71.35	...	wn D	71.59
526	...	....	....	...	....	.....	...	....	.....	...	....	.....
527	1	n B?	5775.81	...	....	.....	...	....	.....	...	....	.....
528	...	....	....	1	n D??	77.82	1	n D	78.48	1	nn D?	77.86
529	2	n B	5780.77	1-2	B	79.86	...	....	.....	...	....	.....
530	...	....	....	...	....	.....	...	....	.....	...	B	73.5
	...	....	....	...	....	.....	...	....	.....	...		82.0
531	2	n D	5785.57	...	....	.....	2	wn D	84.41	...	....	.....
532	...	....	....	...	....	.....	...	....	.....	...	....	.....
	...	....	....	...	....	.....	...	....	.....	...	....	.....
533	...	....	....	...	....	.....	...	....	.....	...	....	.....
534	...	....	....	...	....	.....	...	....	.....	...	D	82.0
	...	....	....	...	....	.....	...	....	.....	...		91.3
535	...	....	....	1	D	98.68	1	nn D?	99.1	1	nn D	98.50
536	...	....	....	1	n D	22.69	...	....	.....	2	n D	22.92
537	...	....	....	...	....	.....	1	n D	48.46	...	....	.....

WAVE-LENGTHS OF LINES IN THE VIOLET REGION OF 19 *PISCIUM*

As already stated, the violet region of 19 *Piscium* was photographed with a one-prism spectrograph attached to the two-foot reflector (Figs. 1 and 2, Plate XI). With the light flint prism and the very short camera of this spectrograph, the scale of the resulting spectrum was too small to permit of precise determinations of wave-length. The results of the measures of plates R 34, 37, and 38 by Mr. Parkhurst are nevertheless valuable, as they permit some of the important lines to be identified, and in fact furnish the only knowledge we have of the positions of lines in this part of the spectrum of fourth-type stars.

Three plates were measured, the numbers, exposure times, and range of spectrum in which the lines were good enough to measure being:

Plate	Exposure	Lines Measured
R 34..............	$5^h\ 30^m$	4255 to 4327
37..............	7 45	4079 to 4380
38..............	24 40	3969 to 4373

The wave-lengths of the star lines on the long-exposure plate R 38 could not be deduced directly from the plate, since there was a shift of the comparison lines due to the exposure being extended over four nights. Therefore a correction was made to the wave-lengths of R 38, deduced by comparison with seven of the best star lines common to R 37 and R 38. This correction, for the seven lines, varied from 2.8 to 6.4 t.m., so that the mean is uncertain by as much as 2 t.m. The uncertainty

TABLE OF MEAN WAVE-LENGTHS CORRECTED FOR RADIAL VELOCITY—*Continued*

78 *Schjellerup*			132 *Schjellerup*			115 *Schjellerup*			152 *Schjellerup*			Mean Wave-Length
Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	Intensity	Character	Wave-Length	
		t.m.			t.m.			t.m.			t.m.	t.m.
...	....	.....	..	....	.....	...	....	.....	...	D	.....	572
...	....	.....	...	....	.....	...	....	.....	...		33.9	
...	....	.....	...	B	33.0	...	B	33.5	...	B	33.9	5733.8
...	....	.....	...		41.4	...		42.6	...		41.3	5742.0
3	n D	43.02	1	nn D	43.60	1	n D?	43.73	2	D	43.26	5743.8
...	....	.....	...	....	.....	...	....	.....	2	B?	46.06	5746.6
2	nn D	49.85	1–2	nn D	49.43	1	n D	48.83	3	D	48.98	5749.4
...	D	42.2	...	....	.....	...	....	.....	...	....	.....	574
...		50.8	...	....	.....	...	....	.....	...	....	.....	
...	....	.....	...	....	.....	...	....	.....	...	....	.....	5751.7
...	....	.....	2	n B?	56.23	max	B	57.55	2	n B	56.41	5757.1
...	....	.....	...	....	.....	...	B	53.0	...	....	.....	575
...	....	.....	...	....	.....	...		61.4	...	....	.....	
3	n D	62.23	2	n D?	61.72	1	n D	62.95	...	....	.....	5762.6
...	....	.....	1–2	B?	66.82	3	n B	67.63	1–2	B	67.09	5767.5
3	n D	70.71	...	....	.....	...	nn D	71.39	2	D	70.10	5771.1
...	....	.....	...	B?	.....	...	....	.....	3	B	73.33	5773.3
...	....	.....	...	....	.....	1–2	n B?	76.41	...	....	.....	5776.1
...	....	.....	...	D??	.....	...	....	.....	...	....	.....	5778.1
...	....	.....	1–2	B?	79.65	2	n B	80.87	4	B	80.11	5780.3
...	B	71.9	...	B	71.5	...	....	.....	...	....	.....	5772.3
...		80.5	...		80.9	...	....	.....	...	....	.....	5781.1
3	wn D	85.23	...	....	.....	...	wn D	84.81	5	w D	84.11	5784.8
...	....	.....	...	D	80.9	...	....	.....	...	....	.....	578
...	....	.....	...		86.7	...	....	.....	...	....	.....	
1	nn D?	89.93	...	D??	.....	...	....	.....	1	D	89.40	5789.7
...	....	.....	...	....	.....	...	....	.....	...	....	.....	578
...	....	.....	...	....	.....	...	....	.....	...	....	.....	
2	n D	97.61	1	n D	97.60	...	....	.....	1	n D	97.32	5798.1
1	nn D	23.44	2	n D	22.11	...	....	.....	1	D	22.09	5822.7
1	n D	49.82	...	....	.....	...	....	.....	...	....	.....	5848.6

of the adopted wave-lengths is increased by the poor quality of the comparison lines on R 37, which has the best star lines.

The star line $H\delta$ is nebulous on plate R 38, and apparently 5 t.m. wide; the uncorrected wave-length is 4103.5; corrected wave-length, 4100.4. On plate R 37 the line seems quite narrow and sharp, the wave-length being 4100.5. The correction to reduce to the wave-length in the Sun, +1.5 t.m., is within the errors of measurement.

The mean wave-lengths from the three plates are given in the following table:

LINES IN THE VIOLET REGION OF 19 *PISCIUM*

Plates R 34, 37, and 38

Intensity	Character	No. Plates	Wave-Length	Solar Lines	Intensity	Character	No. Plates	Wave-Length	Solar Lines
Spec.	begins	..	393		...	Limits	..	4224.4	
				K				4233.3	
..	wn D	1	3967.0	H 3968.6 *Ca*	..	n D	1	4254.4	
..	nn D?	1	4004.4		..	nn D	2	4274.0	
..	nn D	1	4018.3		1	n D	1	4282.8	
1	n D	1	4034.8		..	n D	3	4289.0	
3	n D	1	4058.2		..	w D	2	4303.5	G group
..	nn D	2	4078.7					4312.6	
4	n D	2	4100.5	$H\delta$ 4102.0	..	nn D	2	4325.9	
..	nn D?	2	4132.3		3	D	1	4340.4	$H\gamma$ 4340.6
..	wn D	1	4145.4		2	D	1	4354.2	
..	nn D?	1	4197.5		2	D	1	4363.4	
10	D	2	4227.6	*Ca* 4226.9	6	D	1	4383.7	

WAVE-LENGTHS OF LINES IN THE RED REGION OF 152 *SCHJELLERUP*

Plate G 211, taken on an Erythro plate with camera No. 2 and a single dense flint prism, gives the approximate positions of the lines in the red and orange region of the spectrum of 152 *Schjellerup.* The following measures were made by Mr. Ellerman. On account of the small scale of the spectrum in this region, they may be considerably in error, but they suffice for the identification of some of the strongest lines. This photograph is reproduced in Plate VI.

LINES IN THE RED REGION OF 152 *SCHJELLERUP*

Plate G 211

Intensity	Character	Wave-Length	Remarks
		t.m.	
2	B	5592.4	
..	D	5731.1	End of zone
2	D	5748.9	
1	B?	5757.4	
1	B?	5778.2	
1	n D	5808.4	
..	B?	5845.3	Very n
10	D	5894.3	Sodium, D_1 and D_2
1	n D	5921.9	
1	D	5945.9	
1	B	6020.8	
1	B	6050.0	
1	n D	6059.1	
..	B	6086.1	Brightest part of bright band
3	D	6098.5	
7	B	6108.4	
2	D	6119.0	
8	B	6130.5	Double?
2	B	6154.9	
10	B	6176.0	
2	D	6190.3	
10	B	6200.9	
..	B	6222.1 6253.4	Band increasing from to
10	D	6269.6	Very broad
1	B	6310.8	
1	B	6330.2	
3	D	6357.6	
..	D	6425.3	Center of broad, hazy band
3	B	6444.8	
..	....	6488.2	Spectrum drops off here, dark space
..	....	6587.5	to
..	....	6631..	end of faint continuous spectrum

PRECISION OF THE MEAN WAVE-LENGTHS

The sources of error in this investigation are numerous, and render it impossible to secure a high degree of precision in the results. In the spectrograph the wide slit necessarily employed, the instability of the prism supports, and the variations in temperature of the prisms during the long exposures, tended to produce wide and diffuse lines on the photographs, and to introduce irregular displacements of unknown magnitude. In comparison with these sources of error, which affect both stellar and comparison spectra, all errors due to the measuring machines or to the method of reduction are comparatively unimportant and may be neglected. During the progress of this research the old spectrograph was used by Messrs. Frost and Adams for the measurement of stellar motions in the line of sight. Most of this work was confined to bright stars having well-defined lines in their spectra. But, in spite of the short exposures required for such objects, errors arising from unknown causes were frequently apparent in the results. For example, the star ϵ *Leonis*, as photographed on seventeen occasions between February 11 and April 25, 1900, gave velocities ranging from -10 to $+13$ km. This led to the belief that ϵ *Leonis* varied in its radial velocity, but it was afterward shown that the star has an apparently constant radial velocity of about 5 km. On many other occasions, however,

the spectrograph gave excellent results, agreeing well among themselves and with recent determinations for the same stars made with the Bruce spectrograph. On account of the uncertain behavior of the instrument, it is impossible to base conclusions regarding the precision of our own results upon the contemporaneous observations of known stars by Messrs. Frost and Adams.

A source of error which undoubtedly affected seriously our determinations of radial velocity, giving rise to the widely different values obtained for different lines, is the physical condition of fourth-type stars. As will be shown later, the spectra of these stars differ widely from the solar spectrum, partly through marked changes in the relative intensities of the dark lines, and partly through the presence of bright lines. Both of these causes greatly complicate the determination of radial velocity, and thus introduce errors which appear later in the corrected wave-lengths.

An idea of the precision of the measures may be obtained from the following table, which gives the average deviation of the wave-length of a line in one star from the mean for six, seven, and eight stars. The number of lines used is given in parenthesis after each deviation.

PRECISION OF THE MEASURES

AVERAGE DEVIATIONS

No. of Stars	Blue Region	Yellow-Green Region	Both Regions
	t.m.	t.m.	t.m.
6	0.15 (29)	0.28 (28)	0.22 (57)
7	0.17 (22)	0.22 (24)	0.20 (46)
8	0.22 (19)	0.23 (30)	0.23 (49)
Means.........	0.18 (70)	0.25 (82)	0.22 (152)

The probable error of the mean averages 0.07 t.m.

In such a comparison it is of course assumed that the wave-length of a line does not vary from star to star. That this assumption is in some degree warranted is shown by the residuals at the foot of the following table, which contains the wave-lengths of the forty-nine dark lines measured in all of the stars, with their average deviations from the mean.[28] These results also give a final check on the adopted values of the velocities of motion in the line of sight, as the mean wave-lengths should agree if the velocities were correct. The actual residuals, ranging from -4 to $+4$ km. (mean ± 2.3 km.), show that the adopted values are not greatly in error. The stars in the table are arranged in the assumed order of development (Plate IX).

LINES MEASURED IN ALL OF THE STARS

280 *Schj.*	19 *Pisc.*	818 *Birm.*	74 *Schj.*	78 *Schj.*	132 *Schj.*	115 *Schj.*	152 *Schj.*	Means	a. d.
4435.22	35.52	35.49	35.72	35.92	35.60	35.47	35.97	35.61	0.19
4501.22	01.78	01.87	01.97	01.87	01.92	00.91	02.15	01.71	0.29
4506.38	06 77	07.08	07.04	07.09	07.12	06.74	07.24	06.93	0.22
4512.83	12.76	12.64	12.30	13.08	12.83	13.05	12.81	12.79	0.16
4518.15	18.27	18.31	18.38	18.53	18.35	18.21	18.23	18.31	0.09
4522.91	23.00	23.06	23.20	23.23	23.17	23.08	23.21	23.11	0.10
4535.30	35.84	35.84	35.90	35.70	36.04	35.56	36.21	35.67	0.24
4560.11	60.39	60.42	60.48	60.47	60.23	60.35	60.21	60.34	0.11
4606.26	06.87	06.86	06.88	07.20	06.83	06.24	06.38	06.69	0.27

[28] Out of 537 catalogued lines and spaces, only 49 were common to all the 8 stars. The reasons for this are as follows:

1. The appearance of any given line varied greatly with exposure time and temperature changes, so that it might be unmistakable in character on one plate and so indefinite as to be left unmeasured on another, as the choice of lines to be measured was made independently on each plate.

2. Lines marked doubtful on both plates of a star were not catalogued unless unmistakable in character in other stars.

3. Plates of the faint stars 280 *Schj.*, 74 *Schj.*, and 115 *Schj.* contained comparatively few lines, and at the same time the proportion of doubtful lines on these plates was greater than the average.

By this process of exclusion the number of lines common to all the stars was greatly reduced, though the number measured in 5 or 6 stars was much greater.

LINES MEASURED IN ALL OF THE STARS—*Continued*

	280 *Schj.*	19 *Pisc.*	318 *Birm.*	74 *Schj.*	78 *Schj.*	132 *Schj.*	115 *Schj.*	152 *Schj.*	Means	a. d.
	4617.74	17.80	18.03	17.99	18.09	18.23	17.74	18.15	17.97	0.15
	4619.29	19.68	19.86	19.70	19.85	19.56	19.42	19.40	19.60	0.19
	4638.03	38.75	39.19	39.03	39.15	39.07	38.78	38.96	38.87	0.26
	4766.78	66.11	66.47	66.33	66.55	66.47	66.98	66.54	66.50	0.18
	4822.75	23.91	23.86	23.51	24.02	23.96	23.27	23.86	23.64	0.45
	4826.52	27.81	28.21	28.23	28.31	28.19	27.88	27.90	27.88	0.46
	4832.49	32.51	32.56	32.57	32.61	32.30	32.48	32.46	32.48	0.07
	4882.07	81.69	81.55	81.75	81.71	81.53	81.09	81.52	81.61	0.19
	4900.70	00.81	00.95	01.37	01.34	00.67	01.87	01.18	01.11	0.33
	4920.65	21.03	20.78	20.97	21.00	20.52	21.23	20.54	20.84	0.22
	5226.19	26.19	26.33	26.17	26.35	27.28	26.78	26.98	26.49	0.31
	5234.33	34.27	34.22	33.95	33.97	33.91	33.99	33.44	34.01	0.20
	5247.48	47.56	47.34	47.32	47.43	47.41	47.19	47.21	47.37	0.10
	5251.30	51.44	51.28	51.66	51.47	51.46	51.83	51.31	51.47	0.15
	5270.62	70.46	70.02	70.17	70.55	70.41	70.75	70.05	70.38	0.22
	5298.16	98.19	97.77	97.70	97.63	98.11	98.37	97.40	98.00	0.20
	5315.31	15.27	15.12	15.30	15.09	15.28	15.30	15.40	15.26	0.09
	5337.05	36.94	36.83	36.65	36.86	36.82	36.97	37.30	36.93	0.14
	5341.84	41.30	41.26	41.35	41,59	41.63	41.78	41.61	41.54	0.19
	5372.07	71.70	71.50	71.52	71.68	71.89	71.64	72.10	71.76	0.19
	5377.48	77.58	77.36	77.38	77.38	77.44	77.29	77.07	77.37	0.10
	5380.54	79.82	79.72	79.91	80.47	80.46	80.68	79.91	80.19	0.35
	5397.47	97.58	96.81	97.28	96.91	97.97	96.75	97.88	97.33	0.39
	5420.44	20.17	20.22	19.66	20.53	20.43	20.49	20.13	20.26	0.21
	5430.33	30.39	30.13	29.87	30.27	30.33	30.17	30.24	30.22	0.11
	5448.31	48.09	47.72	47.94	47.62	47.73	47.54	47.06	47.75	0.28
	5456.54	56.96	56.43	56.54	56.81	56.92	56.46	57.13	56.72	0.23
	5461.13	60.99	60.84	60.49	60.96	60.99	60.80	61.18	60.92	0.16
	5475.08	74.56	74.38	74.33	74.46	74.20	74.34	74.35	74.46	0.19
	5557.27	56.32	56.28	55.80	56.38	56.30	56.36	56.24	56.37	0.23
	5567.60	66.60	66.86	66.57	67.23	66.84	67.42	68.08	67.15	0.43
	5584.65	83.98	83.70	83.98	84.02	83.86	83.83	83.69	83.96	0.19
	5587.54	86.95	86.96	86.89	87.23	86.97	87.66	87.57	87.22	0.28
	5634.05	34.21	34.11	34.20	34.23	33.79	34.58	33.76	34.12	0.24
	5645.22	44.07	43.74	43.71	44.29	43.89	45.20	44.57	44.34	0.48
	5671.71	70.83	71.44	71.26	71.34	70.99	71.68	71.22	71.31	0.23
	5694.41	93.78	93.89	93.62	93.79	93.21	94.16	93.17	93.76	0.31
	5706.71	05.41	05.42	05.25	05.05	04.53	05.14	04.97	05.31	0.29
	5731.70	31.20	31.56	31.76	31.48	30.72	31.97	31.60	31.60	0.14
	5744.32	44.35	43.89	43.96	43.02	43.60	43.73	43.26	43.77	0.37
Means..........	5150.86	50.78	50.74	50.72	50.85	50.77	50.84	50.79	50.79	0.23
Residuals t.m...	+0.07	−0.01	−0.05	−0.07	+0.06	−0.02	−0.05	.00	.....	.....
" km...	+4	−1	−3	−4	+3	−1	−3	0	±02.3	.....

THE CARBON BANDS

Since the time of Secchi the characteristic dark bands of fourth-type stars have been attributed to some form of carbon. For the reasons mentioned by Dunér,[29] the measures of Secchi, though they appear to be sufficient to identify the bands, can be given but little weight. The measures of Vogel and Dunér have therefore formed the only reliable basis of comparison. The means of these measures, compared with the wave-lengths of the heads of the carbon bands, are as follows:

Star	Carbon Bands	$\Delta\lambda$, Star—Laboratory	
t.m.	t.m.	t.m.	
437	4381.93	−10. ±	Edge of violet band
4729	4737.18	− 8.	Edge of blue band
5162	5165.30	− 3.	Edge of green band
5633	5635.43	− 2.	Edge of yellow band

[29] *Loc. cit.*, p. 122.

While the differences are in some cases considerable, these measures leave no doubt that the dark bands of the fourth-type stars correspond with the bands of the Swan spectrum. The systematic shift toward the violet of the bands in the star is presumably due to a physiological effect arising from the presence of the bright zones on their less refrangible edges. The largest errors naturally correspond to the faintest bands.

As our photographs show not only the principal heads, but also the secondary heads of the flutings, a careful comparison with the carbon flutings in the electric arc seemed desirable. Photographs of the various bands, compared with photographs of the bands of the carbon arc, are reproduced in Plate VII. From these it will be seen that the fluted structure of the bands is repeated in the stars with perfect fidelity.

The following table contains the mean wave-lengths of the heads of the various flutings, as derived from all of our measures; the number of stars in which each fluting was measured; the maximum and average deviation from the mean wave-length in all of the stars measured; the assumed origin of the flutings; the wave-lengths of the flutings as measured by various investigators in the laboratory; and the differences between the star and laboratory determinations. In these last comparisons the wave-length determinations of Crew and Basquin are used for the cyanogen flutings, and those of Kayser and Runge for the flutings of the Swan spectrum.

HEADS OF THE CARBON FLUTINGS					WAVE-LENGTH IN LABORATORY					$\Delta\lambda$, STAR—LABORATORY	
Mean Wave-Length in Stars Corrected for Slit-Width	No. of Stars	Deviation from the Mean		Origin	Eder and Valenta	Fievez	Hasselberg	Kayser and Runge	Crew and Basquin	Kayser and Runge	Crew and Basquin
		Maximum	Average								
		t.m.	t.m.		t.m.	t.m.	t.m.	t.m.	t.m.	t.m.	t.m.
4380.6	..	...	...	Swan Spec.	4380	......	......	....	....	.....	...
4503.2	5	0.5	0.2	*CN*	....	......	......	....	4502.35	.....	+0.9
4515.0	2	0.4	0.4	*CN*	....	......	......	....	4514.95	.....	0.0
4532.6	4	0.4	0.4	*CN*	....	......	......	....	4532.06	.....	+0.5
4555.3	5	0.4	0.3	*CN*	....	......	......	....	4553.31	.....	+2.0
4578.4	6	0·6	0.5	*CN*	....	......	......	....	4578.19	.....	+0.2
4608.8	6	0.6	0.3	*CN*	....	......	......	....	4606.33	.....	+2.5
4697.2	1	...	...	Swan Spec.	4697.66	......	4696.2	4697.57	....	−0.4	...
4716.5	4	(1.3)[30]	0.2	"	4715.73?	......	4713.7	4715.31	....	+1.2	...
4738.6	7	0.6	0.2	"	4737.25	4736.3	4735.7	4737.18	....	+1.4	...
[5169.1][30]	3	(1.8)[30]	0.4	"	....	5165.6	5165.4	5165.30	....	.....	...
5505.4	3	0.9	0.7	"	....	5504.6	5501.6	....	....	.....	...
5543.5	4	0.4	0.2	"	....	5543.3	5538.5	5540.86	....	+2.6	...
5587.7	3	0.2	0.1	"	....	5581.5	5586.2	5585.50	....	+2.2	...
5638.8	8	0.8	0.4	"	....	5635.0	5637.5	5635.43	....	+3.4	...
		Mean, 0.3								Mean Shift, +1.4 t.m.	

As the average deviation from the mean for a single star is only 0.3 t.m., while the mean shift of the heads of the flutings is 1.4 t.m. toward the red, there would appear to be some actual shift of the flutings in the star. The mean of Vogel's and Dunér's wave-lengths, as given above, indicates a somewhat larger shift toward the violet. It should be remembered, however, that these observations were made visually with very limited instrumental means, which did not permit a high degree of precision to be attained. Dunér's measures of the heads of the carbon flutings, for example, show the following range, which is surprisingly small, in view of the circumstances under which they were made:

132 *Schjellerup*	5640	5168	4715
132 *Schjellerup*	5634	5161	4730
152 *Schjellerup*	5625	5169	4721
152 *Schjellerup*	5635	5165	4740

[30] End of plate; too faint for precise measurement.

Our measures of these heads for the same stars are:

132 *Schjellerup*	5638.7	5169.5	4738.7
132 *Schjellerup*	5638.2	5169.0	4738.5
152 *Schjellerup*	5638.1	5169.1	4739.2
152 *Schjellerup*	5637.8	5168.6	......

It is therefore evident, as might be expected from the use of photographic methods with a much more powerful telescope, that the precision of our determinations of the positions of the flutings is considerably higher than that of Dunér's measures. But it is nevertheless unsafe to conclude that the apparent shift of the flutings in the stars is actually due to some peculiarity of their carbon radiation; for, even with all the advantages of such determinations, the differences between the wave-lengths measured in the laboratory by excellent observers are quite as great as the differences between our wave-lengths for the stars and the laboratory determinations of Kayser and Runge. The measurement of the edge of a more or less diffuse band is always liable to error. But in the fourth-type stars the difficulty of measurement is greatly increased by the presence of closely adjoining, or even overlapping, bright and dark lines. Thus the lines of the *b* group have prevented us from obtaining a satisfactory measure of the head at λ 5165. Under these circumstances we are not inclined to adopt the conclusion that the carbon flutings in the fourth-type stars are actually displaced from their normal positions.

The long discussion on the origin of the Swan spectrum, which has played so conspicuous a part in the literature of spectroscopy, cannot be said to have terminated. This is hardly an appropriate place to present the numerous arguments advanced by the supporters of the various views which are still entertained. The assignment of these bands to carbon monoxide by Smithells,[31] with its subsequent confirmation by Baly and Syers,[32] seemed for a time to set the matter at rest. But the recent work of Konen[33] has revived the discussion. Konen investigated the spectrum of the electric discharge in various liquids containing carbon, and obtained the Swan spectrum in many cases when every precaution had been taken to exclude oxygen. He is therefore inclined to the belief that the Swan spectrum is due to carbon alone, though he admits that if the discharge is very easily affected by minute quantities of oxygen, the Swan spectrum may be due to *CO*. Although Smithells apparently made out a fairly good case in assigning the bands of the Swan spectrum to carbon monoxide, we believe that the importance of the difficulties raised by Konen should not be underestimated. As he points out, the presence of considerable quantities of salts in the solution in which the discharge takes place may not suffice to bring out metallic lines, and the cyanogen bands do not appear in weak solutions of ammonia. It may be, however, that a very small amount of oxygen would act energetically, and suffice to give rise to the Swan spectrum. But the last word on this subject has not been said, and it is to be hoped that further investigations will be made on the spectra of the electric discharge in liquids.[34]

There seems to be little difference of view regarding the origin of the cyanogen bands, which we have identified in the blue part of the spectrum. These bands also appear in the spectra of stars of Secchi's third type, as may be seen from an examination of the spectra reproduced in Plate VII.

Some discussion on the probable condition of carbon in stars of the third and fourth types, as well as in the Sun, may be found on p. 128.

IDENTIFICATION OF THE DARK LINES

The following table, supplemented by remarks on the several elements identified, summarizes the results of our study of the origin of the dark lines. The numbers in the column headed "Widened in Sun-Spots" are those given by Maunder in the *Greenwich Spectroscopic and Photographic Results*

31 "On the Spectra of Carbon Compounds," *Phil. Mag.*, 6th Ser., Vol. I (1901), p. 476.

32 "On the Spectrum of Cyanogen," *Phil. Mag.*, 6th Ser., Vol. II (1901), p. 386.

33 "Ein Beitrag zur Kenntnis spectroskopischer Methoden," *Annalen der Physik*, Vol. IX (1902), p. 742.

34 The investigations by one of us on spark spectra in liquids were undertaken with a different object in view.

for 1880. The amount of widening is in tenths of the normal width; the next column gives the number of spots in which the line was widened, out of eighteen observed. In the red region the amount of widening is taken from Cortie's papers in *Monthly Notices*, Vol. XLIX, p. 410, and Vol. LXII, p. 516.

We are fortunately able to include in the table the wave-lengths of lines in the spectrum of *a Orionis*, as measured by the late Professor Keeler on photographs taken with a three-prism spectrograph at the Allegheny Observatory. These were sent to us by Professor Keeler in manuscript for the purposes of this comparison. At the Conference of Astronomers held at the Yerkes Observatory in 1897 he described his photographs of third-type spectra as follows:

> The series of slides included the spectra of *a Bootis*, *a Aurigae*, *a Tauri*, *a Orionis*, *a Scorpii*, *β Pegasi*, and *a Herculis*, in which may be observed a transition from the second to the third type. In stars like *a Orionis* the lines are essentially those of the solar spectrum, but the relative intensities are not the same, and the general aspect of the spectrum is different from that of the spectrum of the Sun. The dark bands characteristic of third-type stars are well shown, though they are not resolved into lines. The separate lines are doubtless far beyond the resolving power of the instrument. These bands are not always terminated by strong metallic lines, and the appearance noted by early observers was probably due to insufficient optical power. The strong lines are mostly those of iron—apparently the low-temperature lines. Their relatively greater strength in the star spectrum gives to some well-known solar groups (notably the *b* group) quite an unfamiliar aspect.
>
> In *a Herculis* only a comparatively few of the strong metallic lines remain, while the bands are deep, and beautifully distinct. It is impossible to avoid the conclusion that the edges of the zones bordering on the dark bands are bright—much brighter, that is, than the average continuous spectrum—and that they are due to a real predominance of emission at the regions of the spectrum in which they occur. They are not merely the effect of absorption in adjoining regions. In the case of stars like *a Orionis*, of a less pure type, such a conclusion could not be safely drawn; yet the superior brightness of the spectrum at these places is obvious, and it can be traced even in second-type stars. May there not after all be bright regions in the solar spectrum, such as Draper supposed he had found in the places of the bright oxygen lines? And what is the relation between the dark bands in third-type stars and the bright zones which border on them?

It is an interesting fact that some of the bright lines, and also some of the dark lines in fourth-type spectra, similarly lie in close proximity to dark and bright zones.

COMPARISON WITH SUN-SPOTS AND WITH THIRD-TYPE STARS

Fourth-Type Stars		Probable Origin	Widened in Sun-Spots		Remarks		Type III *a Orionis*—Keeler	
Wave-Length	Intensity		Amount of Widening	Number of Spots			Wave-Length	Intensity and Character
t.m.							t.m.	
3933	10	*Ca* (K)	No widened lines in this region		Strong lines	One-prism plate, wave-lengths uncertain by 1 t.m.		
3967	w	*Ca* (H)			See note 5			
4004.4		*Fe, Ti*						
4018.3		*Fe, Mn*						
4034.8	1	*Fe, Mn*						
4058.2	3	*Fe, Co, Cr*						
4078.7		*Fe, Ti*						
4100.5	4	*H* (*Hδ*)			See note 5			
4132.3		*Fe*						
4145.4	1	*Fe*						
4197.5					See note 1			
4227.6	10	*Ca*			Characteristic lines			
4254.4		*Cr*						
4274.0		*Fe, Cr, Ti*						
4282.8	1	*Ca, Fe*						
4289.0		*Ca, Cr, Ti*						
4304 to 4313					G group			
4325.9		*Fe*						
4340.4	3	*H* (*Hγ*)			See note 5			
4354.2	2							
4363.4	2	*Cr*						

COMPARISON WITH SUN-SPOTS AND WITH THIRD-TYPE STARS—*Continued*

Fourth-Type Stars		Probable Origin	Widened in Sun-Spots		Remarks	Type III α *Orionis*—Keeler	
Wave-Length	Intensity		Amount of Widening	Number of Spots		Wave-Length	Intensity and Character
t.m.						t.m.	
......							
......							
4383.7	6	*Fe, V*	No widened lines in this region		Carbon head		
4389.9	2	*V*					
4392.0	2	*Fe, Cr, V*					
4395.0	6-7	*V, Cr, Ti*					
4398.0	1-2						
4401.0	4	*Fe, V, Ni*					
4403.3	4						
4405.1	3-4	*Fe, Y*			See note 4		
4408.5	3	*Fe, V*					
4410.9	1	*Ni*					
4412.4	2	*V, Cr*					
4415.3	3	*Fe*			See note 4		
4416.7	2	*V*					
4420.6	2	*V, Zr*					
4421.7	2-3	*V, Ti*					
4423.0	2	*Fe, Ti, Y*					
4425.9	2-3	*Ca, Ti, V*					
4427.7	2-3	*Fe, Ti*			See note 4		
4430.3	2	*Fe, V*					
4433.9	1	*Fe, Ti*					
4435.6	5	*Ca, V*					
4438.2	2-3	*Fe, V*					
4444.6	2-3	*Fe, Ti, V*					
4445.7	2	*Fe*					
4447.4	2	*Fe, Mn*					
4450.1	3	*Ti, V*					
4455.3	2	*Ti, Ca, Mn*					
4456.7	0-1	*Fe, Ca*					
4458.1	1	*V, Ti, Mn*					
4462.2	4	*Fe, V, Mn*			See note 4		
4465.4	2	*Cr, Ti*					
4466.9	2	*Fe*					
4468.9	1	*V, Ti*					
4471.7	1-2	*Ti, Co*					
4475.3	1	*Ti*					
4475.6	1	*Cr*					
4480.2	1-2	*V, Fe*					
4482.3	2-3	*Fe*					
4487.5	2						
4489.7	2-3	*Fe, V, Cr*					
4497.0	4	*Ti, V, Cr*					
4501.8	2-3	*Ti, V*					
4507.0	3				Carbon head		
4509.8	1-2	*Ca*					
4512.8	2	*Ca, Ti*					
4516.2	1						
4518.3	2	*Ti*					
4520.5	1	*Fe*					
4523.1	3-4	*Ti*			Important *Ti* group		
4527.4	2	*Ca, Cr, Ti*			See note 7		
4528.7	2	*V, Fe*					
4531.3	1-2	*Fe, Cr*					
4533.4	3	*Ti*					
4535.7	4-5	*Cr, Ti*					
4540.5	2-3	*Cr*					
4542.9	2	*Fe, Cr*					
4544.9	2	*Cr, Ti*					
4549.3	4	*Fe, Ti*			See note 7		
4552.8		*Ti*					
4553.8	7	*Fe, Ti*			Carbon head		
4560.3	3-4	*Fe, Cs*			Strongest *Cs* line in Bunsen flame		
4563.5	2-3	*Cr, Ti*			See note 7		
4565.8	2	*Fe, Cr*					

COMPARISON WITH SUN-SPOTS AND WITH THIRD-TYPE STARS—*Continued*

Fourth-Type Stars		Probable Origin	Widened in Sun-Spots		Remarks		Type III α *Orionis*—Keeler	
Wave-Length	Intensity		Amount of Widening	Number of Spots			Wave-Length	Intensity and Character
t.m.			No widened lines in this region				t.m.	
4571.8		*Ti, Cr*						
4575.4	2	*Fe*						
4577.5	1-2	*V*						
4580.5	1-2	*Cr, Fe, V*						
4582.6	1	*Fe, Ca*						
4584.7	2	*Fe*						
4586.4	2	*V, Ca*						
4587.4	2	*Fe*						
4591.2	2	*Cr, V*						
4594.2	2-3	*V*						
4597.4	1-2	*Cs*						
4600.8	2	*Cr, Ni*						
4602.9	2	*Fe*						
4606.8	7	*Ni*			Carbon head 4609			
4607.5	4	*Fe, Sr*						
4610.3	1							
4611.4	2	*Fe*						
4613.9	2-3	*Cr, Fe*						
4616.4	3-4	*Cr*						
4619.5	3-4	*Fe, Cr*						
4622.9	2	*Cr, Ti*						
4628.7	1	*Cr*						
4629.7	4	*Ti, Co*						
4634.4	1							
4637.6	1	*Fe*						
4640.4	4-5	*Fe, V, Ti*						
4646.4	4	*Cr*						
4654.1	2-3	*Fe*				Dark band, continuous spectrum very faint		
4656.4	2	*Ti*						
4664.1	2	*Cr*						
4668.1	3	*Fe, Ti, Ni*						
4674.9	2-3	*Fe, Ti*						
4682.3	1-2	*Ti*						
4688.6	1	*Fe*						
4691.1	1	*Ti, Fe*						
4697.0	2	*Cr*						
4702.0	1	*Ni*						
4703.8	1	*Ni*						
4714.7	4	*Ni*						
4715.6		*Ni*			Carbon head 4716			
4722.6	1-2	*Ti, Zn*						
4729.1	1	*Fe*						
4732.5	1	*Ni*						
4736.2	10	*Fe*			Carbon head { 4738, 4744 }			
4740.1	1					Bright zone: dark lines may be obscured or displaced by bright lines		
4743.9	10	*Fe? Ti*						
4749.6	2							
4751.6	10	*V*			Carbon head 4754 in 152° *Schj.*			
4756.1	1	*Fe, Cr*						
4758.9	3-4	*Ti*						
4766.5	1-2	*Mn*						
4772.6	2	*V, Fe*						
4776.8	1-2	*V*						
4784.5	1-2							
4789.6	1-2	*Fe, Cr*						
4806.2	1							
4812.1	1	*Ni, Ti*						
4815.9	2							
4823.8	1-2	*Fe, Mn*						
4828.0	2							
4832.5	3-4	*Fe*						
4836.3	1							
4839.7	1	*Fe*						
4843.4	1-2	*Fe*						
4851.8	1	*Ca, V*						

COMPARISON WITH SUN-SPOTS AND WITH THIRD-TYPE STARS—*Continued*

Fourth-Type Stars		Origin	Widened in Sun-Spots		Remarks	Type III α *Orionis*—Keeler	
Wave-Length	Intensity		Amount of Widening	Number of Spots		Wave-Length	Intensity and Character
t.m.						t.m.	
4855.5	1-2	*Ni*			Bright zone: dark lines may be obscured or displaced by bright line	......	
4859.6	1	*Fe*				......	
4861.3	10	*H*, ($H\beta$)			Bright in 280 *Schj.* note 5	4861.5	About the same as Sun
......						4864.4	Stronger than Sun
4865.1	2	*V*				......	
4867.7	1-2	*Co*	4	7		......	
4871.5	2-3	*Fe*	6	14		4871.8	Same as Sun
4875.5	2	*V*	2	3		4875.6	Strong in star Sun?
4878.3	1	*Ca, Fe*	5	13		4878.3	Same as Sun
4881.6	3-4	*V, Fe*	6	9		4882.0	Triple, as in Sun, but stronger
4886.0	4	*Fe, V*	2	2		......	
4890.3	1-2	*V*				4890.9	Same as Sun
......						4891.6	
......						4900.3	Stronger than Sun
4901.1	2	*Ti, V*				......	
4906.4	3-4	*V*				......	
4910.3	2	*Fe*	1	4		......	
......						4919.2	Same as Sun
4920.9	2-3	*Fe*	7	13		4920.7	Same as Sun
4925.2	1	*Fe*	2-3	6		......	
......						4933.4	Somewhat stronger than Sun
4934.1	2	*Fe, Ba*	5-6	13		4934.3	
......						4937.5	Stronger than Sun
......						4938.8	
......						4939.9	
4945.6	1-2	*Fe, Ni*	4	3		......	
......						4956.0	Strong, not in Sun
4958.4	2					4957.6	Same as Sun
4981.8	w	*Fe, Ti*	6	10		4982 to 4984	Group, same as Sun. Edge of band. All in dark band
						34 lines not in Type IV, in dark band	
5167.2	2	*Fe, Mg*, (b_4)	5	15	Carbon head 5164, see note 6	5167.6	Very strong, same as Sun
					Bright space	5169.2	
						5171.8	Stronger than Sun
5173.4	5	*Ti, Mg*, (b_2)	8-9	15	See note 6	5172.9	Same as Sun
5183.8	3	*Mg*, (b_1)	5	15		5183.8	Same as Sun
5189.2	1-2	*Ca, Ti*	5-6	7			
......						5191.6	Same as Sun or a little stronger
5193.3	3-4	*Fe, Ti, V*	4 5	7		5192.5	
......						5195	
5202.4	1	*Fe*	6	6			
......						5204.8	Equal lines stronger than Sun
5205.8 to 5210.1	10	*Cr, Fe, Ti*	6	12	Very strong line See notes 3, 4, and 7	5206.2	
						5208.6	Weak in Sun
						5210.6	
5216.7	2	*Fe*		4			
......						5219.6	Not in Sun
5226.5	7	*Cr, Fe, Ti*	5-6	8	See notes 3 and 4	5224 to 5227.2	Group, stronger than Sun
5234.0	3	*V*	4-5	3			
5239.8	2		2	2			
5247.4	3-4	*Cr, Fe, Ti*	4	2		5247.7	Strong, weak in Sun
5251.5	3-4	*Fe, Ti*	3	2	See note 4	5250.6	Stronger than Sun
......						5252.3	
5255.6	1-2	*Cr, Fe*	5	5		5255.1	
......						5264.1	
5265.9	1	*Ca, Cr*	2-3	7			
......						5269.7	Stronger than Sun
5270.4	4-5	*Ca, Fe*	5-6	12	*E.* See notes 2 and 4	5270.4	

COMPARISON WITH SUN-SPOTS AND WITH THIRD-TYPE STARS—*Continued*

Fourth-Type Stars		Probable Origin	Widened in Sun-Spots		Remarks	Type III *α Orionis*—Keeler	
Wave-Length	Intensity		Amount of Widening	Number of Spots		Wave-Length	Intensity and Character
t.m.						t.m.	
5283.6	1–2	*Fe*	4	5			
......						5297.0	Stronger than Sun
5298.2	3 4	*Cr, Ti*	5	5	Strong *Cr* group; see note 3	5298.0	Same as Sun
5302.5	1–2	*Fe*	5	5			
5307.5	1	*Fe*	8	4			
5315.2	2–3	*Fe*					
5320.8	2–3	*Fe*					
5325.3	1	*Co*					
						5328.5	Somewhat stronger than Sun
5329.0	3–4	*Cr, Fe*	6	3	Strong *Cr* group, note 3		
5336.9	2	*Ti*	5	6			
5341.5	3	*Fe, Mn*	3–4	6		5341.2	Stronger than Sun
......						5346.0	Stronger than Sun
......						5348.5	A little stronger than Sun
5350.0	3	*Ca, Fe*	5	6		5349	
5362.7	1	*Fe, Co*	2–3	3			
5366.6	2						
......						5370	Same as Sun
5371.7	7–8	*Fe, Cr*	6	8	See note 4	5371.6	Stronger than Sun
......						5376.0	Not in Sun
5377.4	2–3	*Fe, Mn*	8	1			
5384.7	1						
5391.1	1		4	3			
5397.3	4	*Fe, Ti*	6	6		5397.2	Stronger than Sun
......						5404	Weaker than Sun
5406.4	1	*Fe*	8	6		5406	Stronger than Sun
5408.3	2–3						
5410.4	2–3	*Cr*	5–6	5		5410.0	Stronger than Sun
......						5411.1	Same as Sun
5414.2	1–2						
5420.2	3		1	2			
......						5424.2	Same as Sun
5425.1	1	*Ni*					
......						5426.5	Not in Sun
5430.2	3	*Fe*	6	6		5429.9	Stronger than Sun
......						5433.0	Stronger than Sun
5434.3	1–2	*Fe, V*	4	5		5434.7	Stronger than Sun
......						5436	Same as Sun
5438.6	1–2	*Fe, Ti*					
......						5445.2	Same as Sun
5447.8	7	*Fe, Ti*	6	5	See note 4	5447.0	Stronger than Sun, edge of band
......						5455.7	Stronger than Sun
5456.8	2–3						
5460.9	1–2					5461.0	Not in Sun
......						5463.0	Weaker than Sun
5467.3	1–2	*Fe*	1	1			
5474.5	1–2	*Fe*	2	1			
5478.0	1–2	*Ti*	3–4	1		5477	Same as Sun
5483.0	1–2	*Fe*	3	1			
5498.0	4	*Fe*	5–6	4		5497.6	Stronger than Sun
5501.8	2	*Fe*	5	5		5501.6	Stronger than Sun
5507.1	1	*Fe*			Carbon head 5505	5507.0	Stronger than Sun
5512.4	2–3	*Fe, Ti*	5	5			
5524.3	1–2	*Fe*					
5525.4	1–2	*Fe*	6	1			
5528.6	1	*Mg*	5	6	Carbon flutings	5528.5?	Same as Sun
5533.9	1						
5539.5	7				Carbon head 5543		
5546.6	1–2	*Fe*					
5548.3	2	*V*					
5552.5	1						Region here same as Sun
5556.4	1–2						
5562.6	1	*Fe*	1	1			
5567.0	2		2	1			
5570.2	1	*Fe*					

COMPARISON WITH SUN-SPOTS AND WITH THIRD-TYPE STARS—*Continued*

Fourth-Type Stars		Probable Origin	Widened in Sun-Spots		Remarks		Type III α *Orionis*—Keeler	
Wave-Length	Intensity		Amount of Widening	Number of Spots			Wave-Length	Intensity and Character
t.m.							t.m.	
5573.7	1							
5576.2		*Fe*						
5583.9	8				Carbon head 5587	Carbon flutings		Region here same as Sun
5589.2	1	*Ca*	4	4				
5594.7	1–2	*Ca*	4	5				
......							5598.5	Stronger than Sun
5609.4	2							
5615.7	1	*Fe*	4	4			5615.7	Same as Sun
5620.3	2 3		2	1				
5625.1	4	*V, Fe*	2	3	See Note 8		5624.7	Stronger than Sun
5634.0	10	*Fe*	1	1				
5644.2	1–2	*Ti*			Carbon head 5638			
5650.1	1	*Fe*						
5658.2	1–2	*V*	3	3			5658.5	Stronger than Sun
......							5663.0	Stronger than Sun
......							5669	
5671.3	1–2	*V*						
5675.5	2	*Ti*	2	1		Bright zone, identifications uncertain		Strong, diffuse band not in Sun
5676.7	1–2							
......							5682	
5696.7	1							
5708.3	2–3	*Fe, Ti*	1–2	3			5709.6	Stronger than Sun
5712.8	1–2		1	2			5712	Stronger than Sun
5721.3	2							
......							5727.2	Stronger than Sun
5731.6	3–4	*Fe, V*	3	2			5732.0	Stronger than Sun
5743.7	2	*V*						
5749.4	2							
5751.7	1		1	2				
5762.5	2	*Fe, Ti*						
5771.0	2	*Fe*						
5778.0	1							
5784.8	3	*Fe*						
5789.6	1							
5798.1	1	*Fe*	1	1				
5822.9	2							
5848.5	1	*Fe*						
......							5856	
......							5860	
......							5865	Region quite different from Sun
......							5869	
......							5875	
......							5882	
5894.3	10	*Na* (D)	3		Widened lines obs. by Cortie		5890.2	Stronger than Sun
......							5896.4	
......							5914	Sun?
5921.9	1		5					
5945.9	1		5					
6035		*Sr*	10					
6059.1	1	*Sr*	10					
6098.5	3		5-6					
6119.0	2		6–7		Broad B line			
6190.3	2		4-5		Broad B line			
6269.6	10	*CaO, V*	10		Very strong. See note 1			
6357.6	3		2–3					
6425.3	w		6–7					
6488 to 6588								

1. *Calcium* is well represented in these stars, the only contradictory evidence being the possible absence of the lines λ 5260 to λ 5265 (lines but slightly broadened in Sun-spots), which are probably obscured or displaced by emission spectrum. The line λ 4226.9 is nearly as strong as H and K, suggesting a low temperature. The

strong flame lines at λ6183 and λ6202 fall on bright lines, but the very strong star line at λ 6270 may include the flame line at λ6265, attributed by Eder to *CaO*.

2. The group at λ5270 consists of two strong *Fe* lines and one strong *Ca* line. In the arc, with iron or carbon poles, the two iron lines are of equal intensity, but they are so different in the spark that the arc intensity (relative to the spark line as unity) is 0.9 for the line λ5269.7 and 5 for λ5270.5. When titanium carbide (85 per cent. *Ti*) was placed on the lower carbon of the arc lamp, with four times the original exposure the line λ5269.7 kept its intensity, while λ 5270.5 dropped to one-third. The wave-length of the center of the strong star line corresponds with the *Fe* line, which is strengthened in the arc, but weakened in the presence of *Ti*. This is also the wave-length of the *Ca* line.

3. *Chromium.*—The chromium lines in the region λ4400 to λ4900 are relatively weak in the arc and not represented by strong star lines. On the other hand, in the region λ5100 to λ5700 the most prominent chromium lines are relatively very strong in the arc, are usually widened in Sun-spots, and are represented by strong star lines. For example, the group λ5204 to λ5208 coincides very nearly with one of the most intense star lines outside the carbon flutings. The chromium line at λ5225.1 seems to form with the iron lines at λ5227, the strong star line λ5224.4 to 5228.6. The groups λ5296 to λ5298 and λ5328 to λ5329 coincide closely with strong star lines. The principal item of contradictory evidence is the lack of a star line to match the chromium group λ5275 to λ5276, but it will be noticed that this group is but slightly widened in Sun-spots.

4. *Iron* is doubtless present in the star, but represented by comparatively weak lines. The principal cases in the blue region where the star lines are strong are λλ4405, 4415, 4427, 4462. In the yellow-green region numerous *Fe* lines, strong in the arc and broadened in Sun-spots, correspond with strong star lines; for example: associated with *Ti* at λλ5251, 5370, 5447; with *Cr* and *Ti* at λλ5208, 5227; and with *Ca* at λ5270.

5. *Hydrogen.*—Of the hydrogen lines $H\beta$ is present as a strong bright line in some plates of 280 *Schjellerup* and absent in others, but never appears as a dark line. $H\gamma$ is present and $H\delta$ prominent in the violet plates of 19 *Piscium* as dark lines.

6. *Magnesium.*—The *b* group is a prominent feature of the spectrum, and numerous other lines are present.

7. *Titanium.*—The group λ4512 to λ4536 gives striking evidence of the presence of titanium in the star. Of the eleven lines, ten are strong in the arc and represented in the star, while the line λ4534.2 alone is weak in the arc and absent in the star. For remarks on the behavior of the lines of this group in other stellar types, see p. 134. In the yellow region the titanium lines which are strong in the arc and much widened in Sun-spots are represented by strong star lines; for example, the line λ5210.6, which according to Cortie[35] was the most widened line between D and *b* in the spot of May, 1901, is the strongest star line, and no line which is missing in the star has an intensity greater than 1 in the arc, or a widening greater than 4 in Sun-spots.

8. *Vanadium.*—The presence of vanadium seems well attested. The triplet at λ5624–5628 is especially remarkable, as it is very strong in the arc and coincides closely with the strong star line whose limits in the best plates are λ5623–5628. In the vanadium arc used the vanadium lines are weak in the region λ5100 to λ5500, and strong in the region λ5500 to λ5900. These strong lines are well represented in the star or obscured by the bright lines and zones. In general the vanadium lines which are missing in the star are weak in the arc.

No vanadium lines are identified as among those widened in Sun-spots by Maunder in the *Greenwich Results* for 1880. Photographs taken at the Yerkes Observatory show numerous vanadium lines widened, and it is now well known that vanadium lines are very characteristic of Sun-spots.

LINES WIDENED IN SUN-SPOTS

The agreement of the fourth-type with Sun-spot spectra is especially noticeable in the region λ5160–5500. The numerous lines in the region λ5500–5700 which are widened in Sun-spots are masked in the stars by the carbon flutings, so that but few coincidences are found. Taking the data from the *Greenwich Results* for 1880, the forty-six lines which are most strongly and frequently widened in the spots are found to be the most prominent dark lines in the star. They are identified as follows:

Fe - - -	22 lines	*Mg* - - - - -	3 lines
Ti - - - -	9 lines	*Ca* - - - -	2 lines
V - - -	5 lines	*Mn* - - - - -	1 line
Cr - - - -	4 lines		

35 *Monthly Notices*, Vol. LXII, p. 516.

TITANIUM

A comparison of Hasselberg's list in the region λ 5186–5823 gives the following results:

Lines Found in the Stars		Lines Not Found in the Stars
Widened in spots....................23 Mean number of spots................ 4 Mean widening....................... 5 Mean intensity in star................ 3	Not widened.....................4	Widened............................ 9 Not widened........................41

It is unfortunate that a similar comparison cannot be given for vanadium. Maunder does not give wave-length determinations, and his tables of vanadium lines were apparently inadequate for the identification of the fainter lines, which are frequently greatly widened in spots.

The following table contains Young's observations of lines widened in Sun-spots, compared with the fourth-type lines:

YOUNG'S LINES WIDENED IN SUN-SPOTS

Wave-Length Reduced to Rowland's Scale	Amt. Wid.	Wave-Length and Character in Star (Dark line unless otherwise stated)	Wave-Length Reduced to Rowland's Scale	Amt. Wid.	Wave-Length and Character in Star (Dark line unless otherwise stated)
5191.5	2	B? lines	5424.7	3	25.1
5192.7	2	B? lines	5429.9	3	30.2
5198.9	3	B? lines	5434.1	4	34.3
5202.5	2	02.4	5447.0	4	46 to 49
5204.7	4	04.6 to 11.5	5455.8	3	56.77, shifted by B at 53.8
5208.6	4		5487.9	3	B 86.5
5227.2	2	24.4 to 28.6	5497.7	2	98.0
5230.0	2		5501.6	2	01.8
5233.1	2		5532.7	2	Carbon fluting
5266.8	2		5572.8.	2	
5269.5	3	69 to 71	5584.8	4	83.9; strong, limits 81.9 to 85.9
5270.5	3		5586.6	3	
5328.1	2		5592.3	2	B zone
5328.3			5598.3	2	
5340.2	2		5602.9	2	
5341.2	2	41.5	5615.7	3	15.7
5353.5	2		5624.2	2	18.6 to 26.2
5370.1	4	70.1 to 73.7	5662.7	4	B zone
5371.6	4		5706.3	4	
5397.2	7	97.3 w	6065.7	3	59 w
5404.2	4	06.4	6136.8	3	
5405.9	4		6191.7	2	90, narrow, between two B lines
5415.6	3	14.2	6358.9	..	

Young's list contains forty-six widened lines between λ 5167 and λ 6357. Of these twenty-five appear in the star (53 per cent.), while twelve are obscured by bright lines. In the region best photographed and most favorable for identification, λ 5167 to λ 5531, Young has thirty-three widened lines, of which twenty appear in the star (60 per cent.) and three are obscured by bright lines.

IDENTIFICATION OF THE BRIGHT LINES

We have met with little success in attempting to identify the bright lines in fourth-type spectra. If numerous Sun-spots exist on these stars, it might be expected that violent eruptive phenomena would accompany them, and perhaps be recognizable spectroscopically. But a careful comparison with the chromospheric lines has given no evidence of genuine coincidences, except in the case of $H\beta$, which is bright in a few of the fourth-type stars. Comparisons with the spectra of nebulæ, the aurora, various terrestrial gases, etc., have resulted similarly. Only in the case of the Wolf-Rayet stars is there any evidence of a common origin, and here it is too insecure to have much weight. The following table contains the results of a comparison of some of the Wolf-Rayet lines, as measured by Campbell,[36] with bright lines in fourth-type spectra.

[36] *Astronomy and Astrophysics*, Vol. XIII (1894), p. 448.

In examining this evidence it should be borne in mind that the "very bright" (++) Wolf-Rayet lines λλ 4442, 4688, and the "bright" (+) lines λλ 4480, 4504, 4626, 4636, are certainly absent from fourth-type spectra. It will be noticed that these include Rydberg's principal series hydrogen line at λ 4688, which is one of the most conspicuous and characteristic lines of the Wolf-Rayet stars. In some of them, however, it is inconspicuous, and in *SDM.*−11°4593 it is not observable visually, though shown on Campbell's photographs. λ 4442 is very bright in many of the Wolf-Rayet stars, but in some of them it was neither seen nor photographed. From the range of Campbell's measures it seems quite improbable that the Wolf-Rayet line λ 4466 can coincide with the fourth-type line λ 4464.0. The Wolf-Rayet line λ 4473 is presumably the helium line λ 4471.7; hence it probably

FOURTH-TYPE STARS				WOLF-RAYET STARS—CAMPBELL				
Wave-Length		Intensity	No. Stars	Wave-Length		Intensity	No. Stars	Remarks
Mean	Range			Mean	Range			
4464.0	63.8-64.1	4-5	7	4466	65-67	+	4	
4473.6	73.6-73.6	4	2	4473	73-74	+	2 (Dark in 3)	Helium line λ 4471.7
4508.6	08.2-08.7	4	4	4509	04-10	++	4 (Dark in 1)	Blend of λ 4504 with λ 4517
4517.3	17.1-17.7	2	5	4517	15-18	+	4	
4539.0	38.7-39.2	3	6	4541	34-44	++	21	Second series *H* line λ 4542.0
4596.1	95.8-96.2	4	7	4596	92-98	....	5	
4615.1	15.0-15.2	5	6	4615	14-16	....	4	
4653.0	52.8-53.1	3	3	4652	50-54	++	14	
4861.3	60.7-61.5	2-9	4	4862	.....	++	21	*H*β
5412.4	12.3-12.6	2	5	5412	10-16	++	24	Second series *H* line
5472.3	71.8-72.4	3-4	6	5472	69-74	+	13	
5592.4	91.8-93.2	2-3	7	5593	90-96	+	15	
5693.8	93.2-94.4	6	8	5693	90-95	++	18	Sharp in *DM.*+30° 3639, where wave-length is 5694.0

does not correspond with the fourth-type line λ 4473.6. The Wolf-Rayet line λ 4541 is undoubtedly a line of the second series of hydrogen; the mean wave-length of this line, as determined by Messrs. Frost and Adams on ten plates of four *Orion* stars, is 4542.0; hence it does not correspond with the fourth-type line λ 4539.0. This fact, together with the absence of the λ 4688 line of the principal series, makes it improbable that the agreement of the fourth-type line λ 5412.46 with the second series hydrogen line λ 5412 can have any meaning. On account of the well-known relationship between Wolf-Rayet and *Orion* type stars, it may be that the Wolf-Rayet lines λλ 4596, 4615, 4652 correspond with the oxygen and nitrogen lines λλ 4596.29 (*O*), 4614.0 (*N*), 4650.9 (*O*).[37] This would admit of the presence of the first of these lines in fourth-type stars, but would exclude the second and third. In this connection it should be added that oxygen and nitrogen lines (not present in Wolf-Rayet stars) may possibly coincide with fourth-type lines as follows:

OXYGEN AND NITROGEN	FOURTH-TYPE STARS		
Wave-Length (Frost and Adams)	Wave-Length	Intensity	No. Stars
4591.07 (*O*)	4590.3	3	3
4621.55 (*N*)	4621.5	5-6	5
4630.7 (*N*)	4631.2	4	5
4638.94 (*O*)	4638.9	4	8
4641.89 (*O*)	4642.1	4	6
4661.73 (*O*)	4660.6	2-3	3

In the first case the agreement is not satisfactory; in the last the line is so broad in the stars that it might include the oxygen line. The other four lines are conspicuous in most of the stars, and the close agreement of wave-lengths may perhaps be significant. It should be remarked, however, that many of the most prominent lines of oxygen and nitrogen do not appear among the fourth-type lines.

[37] Wave-lengths of Frost and Adams; identifications of Neovius.

With further reference to the Wolf-Rayet stars, it may be said that the generally broad and diffuse character of the lines, while it undoubtedly complicates the comparison by rendering the measures less accurate, may not preclude coincidence, in some cases at least, with the narrower fourth-type lines; for Campbell states[38] that in the Wolf-Rayet star *DM.*+30°3639 the lines are better defined than in any of the other spectra, and that λ 5694 is so sharp that it appears to be monochromatic. The close agreement of the wave-length of this line, determined from a long series of measures of this star made by Campbell, with that of the very strong and characteristic fourth-type line λ 5693.8 suggests a common origin.

Since $H\gamma$ and $H\delta$ have been found with the two-foot reflector to be present as very prominent dark lines in the spectrum of 19 *Piscium*, while $H\beta$ is present as a strong bright line in 280 *Schjellerup*, it becomes a matter of great interest to determine the character of the $H\beta$ line in the spectra of other stars of the fourth type. From an examination of the catalogue of lines (see line No. 278, p. 100) it will be seen that $H\beta$ appears to be absent from the spectra of 19 *Piscium*, 318 *Birmingham*, 78 *Schjellerup*, and 132 *Schjellerup*, while it is recorded as follows in the spectra of four stars:

Star	Intensity	Character	Wave-Length
280 *Schjellerup*	9	B	4861.4
78 *Schjellerup*	2	nn B	4861.5
115 *Schjellerup*	"Max"	B	4861.5
152 *Schjellerup*	1-2	n B??	4860.7

Hitherto the presence of dark $H\delta$ and $H\gamma$ lines in the spectra of fourth-type stars has been proved only in the case of 19 *Piscium*.[39] In the spectrum of this star $H\beta$ is very faint or absent. Thus the condition of hydrogen in this star (and presumably in others of the fourth type) resembles its condition in the Wolf-Rayet stars, where the ultra-violet lines of this gas are dark, while some of the less refrangible lines are absent or bright.[40]

We would base no final conclusion on the data now available, but we believe that the slender evidence of similarity of spectra here presented, together with the collateral evidence afforded by the peculiarity of the hydrogen radiation in both types of stars, and their tendency to cluster in the Milky Way, should lead to a thorough investigation of the bright lines in the future. Some discussion of the bearing of these matters on stellar evolution and the classification of stellar spectra may be found elsewhere.[41]

The bright $H\beta$ line in 280 *Schjellerup* seems to vary in intensity. The following photographs are available to test the question, and seem to leave no doubt regarding the fact, though the dispersion of the one-prism plates is insufficient to show minor changes:

INTENSITY OF THE BRIGHT $H\beta$ LINE IN 280 *SCHJELLERUP*

Plate No.	Date	Intensity	Plate No.	Date	Intensity
	y. m. d.			y. m. d.	
G 202	1898 6 3	Not shown	346	1899 10 18	10
234	9 7	10	360	12 21	Not shown
245	10 26	Not shown	366	12 28	" "
246	{10 31, 11 1}	" "	367	12 29	" "
			370	1900 1 2	" "
274	1899 1 14	" "	385	2 15	" "
345	10 12	" "	388	2 25	" "

Pickering states that the $H\beta$ line is of variable intensity in the spectrum of the star *A.G.C.* 9181.[42]

[38] *Loc. cit.*, p. 461.

[39] With existing instruments the experiment of photographing the violet region of the spectrum of 280 *Schjellerup* (in which $H\beta$ is sometimes bright) would be rendered extremely difficult by the faintness of this star.

[40] See p. 130.

[41] See p. 134.

[42] *Astrophysical Journal*, Vol. VII (1898), p. 139.

VARIABILITY OF FOURTH-TYPE STARS

There are 237 stars of this type included in Espin's *Revised Catalogue of the Stars of the IV Type,*[43] published in 1898. Of this number twenty-eight are recognized as variable in Chandler's *Third Catalogue*, and twenty more are included in the supplement issued in 1901 by the committee of the Astronomische Gesellschaft.[44] The total, forty-eight, is 20 per cent. of the whole number. The amount of variation, as given by the above catalogues, averages 2.4 magnitudes for forty-one stars. The range of variation is distributed as follows:

Range	Number of Stars	Percentage	
		Type IV	All Stars
Less than 1 mag.	1	2	..
1 mag. and less than 2	13	32	18
2 mag. and less than 3	12	29	6
3 mag. and less than 4	7	17	9
4 mag. and less than 5	5	12	50
5 mag. and greater	3	7	18
	41		137

Column two gives the number and column three the percentage of stars having each range, and the last column gives corresponding percentages from Chandler's table[45] for all the variables well determined in his *First Catalogue*. In comparing the two columns of percentages, it should be remembered that Chandler's stars include the short-period variables, of small range, giving a maximum to the curve at a range between 1 and 2 magnitudes; but none of these short-period stars are of Type IV. Leaving these out of consideration, the maximum range for variables in general is about 4 or 5 magnitudes, but for Type IV the maximum range is about 2 magnitudes.

It now becomes interesting to consider the proportion of variables among stars of Types III and IV, as shown in the following table:

List	Number of Stars	Number of Variables	Percentage	Types
Espin[46]	237	48	20	IV
Dunér[47]	297	45	15	III
Frost-Scheiner[48]	1,217	125	10	III and IV

The above tables are necessarily incomplete, and it is probable that the number of variables in each class will be increased as observations are multiplied. But, as they stand, the tables are fairly comparable, and show that the tendency to variability is somewhat greater in stars of Type IV than in those of Type III.

DISTRIBUTION OF FOURTH-TYPE STARS

The distribution of 242 stars of the fourth type with respect to the Milky Way was investigated by Mr. Parkhurst in 1898 and the results were presented at the Second Conference of Astronomers in August of that year. In 1899 Rev. T. E. Espin published in the *Astrophysical Journal* (Vol. X, p. 169) the results of a similar count of 224 stars, showing close agreement with Mr. Parkhurst's count. Both show that the distribution in north and south galactic latitude is quite similar, and that the stars are scattered quite evenly in the zone of latitudes greater than 30°. The following table gives the results found by Espin and Parkhurst, also the distribution of 9676 *Durchmusterung* stars of magni-

[43] *Monthly Notices*, Vol. LVIII (1898), p. 443.

[44] *Astronomical Journal*, Vol. XXII, p. 77.

[45] *Ibid.*, Vol. IX, p. 2.

[46] *Loc. cit.*, p. 444.

[47] "Sur les étoiles à spectres de la troisième classe," p. 15.

[48] *Astronomical Spectroscopy*, p. 402.

tudes 6.5 to 9.5, from Seeliger's count in the second Munich catalogue. The "Density" column gives the number per unit area (the sphere being taken as unity); the column "Condensation" gives for each zone the ratio of its density to the density in the zone >30°.

Zone	Number of Stars		Density		Condensation		
Galactic Lat.	Espin	Parkhurst	Espin	Parkhurst	Espin	Parkhurst	*DM.* Stars
0°- 5° } 5°-10°	123	92 46	708	1,060 532	11.4	18.3 9.2	2.7 2.6
10°-20°	43	58	256	345	4.0	6.0	2.1
20°-30°	27	17	171	108	3.0	1.9	1.5
>30°	31	29	62	58	1.0	1.0	1.0
Total	224	242					

PHYSICAL CONDITION OF FOURTH-TYPE STARS

The results described in the foregoing pages enable us to draw certain conclusions regarding the physical and chemical condition of fourth-type stars. It has long been assumed, perhaps on insufficient grounds, that the red color of these stars, indicating great general absorption in their atmospheres, might be considered as an index to a temperature lower than that of the Sun. Although we have been able, by giving a very prolonged exposure, to photograph the H and K lines in the spectrum of 19 *Piscium*, the faintness of this region in fourth-type spectra is so great that with ordinary exposures no trace of it is shown. With this marked increase of general absorption we also find evidence of increased selective absorption. This is most conspicuous in the case of the carbon bands[49] and the violet cyanogen band, which are wholly absent from the solar spectrum. The metallic lines are also in many cases much stronger than in the solar spectrum. These changes of intensity, for the most part, are such as would probably result from the cooling of a star like the Sun, especially if such cooling were accompanied by the development of extensive Sun-spots.

Let us now inquire more closely into the physical constitution of the fourth-type stars, at first with special reference to the level in their atmospheres at which the carbon absorption occurs. It is fortunately possible to answer this question with some definiteness, in view of certain observations of the carbon bands in the solar chromosphere made by one of us.[50] According to Lockyer's early view, the carbon flutings in the solar spectrum were due to the absorption of carbon vapor in the corona, at some distance above the chromosphere.[51] The large solar image given by the forty-inch Yerkes refractor permitted a test of this question to be made in 1897. With excellent atmospheric conditions and a very narrow tangential slit the numerous fine lines which constitute the green carbon fluting were seen to be bright at the very base of the chromosphere. As the least displacement of the instrument caused the lines to disappear, it was evident that the layer of carbon vapor is very thin, probably not exceeding a single second of arc in thickness. Subsequently, under exceptionally favorable conditions, seven lines in the yellow carbon fluting were seen as bright lines in the chromosphere. At the eclipse of January 22, 1898, the arcs corresponding to the heads of the cyanogen fluting at $\lambda 3883$ were among the shortest photographed in the flash spectrum.[52]

The probability thus derived from solar observations that the carbon vapor in fourth-type stars lies in close contact with the photosphere is strengthened by the fact that several of the bright lines in fourth-type spectra are superposed upon the carbon flutings. It would thus appear that the unknown gases which produce these bright lines rise above the low-lying carbon vapor, just as hydrogen, helium,

[49] Throughout this discussion the bands or flutings of the Swan spectrum are referred to for convenience as the "carbon" bands. These may be due to some compound of carbon: presumably, if this is the case, to carbon monoxide (see p. 116).

[50] GEORGE E. HALE, "On the Presence of Carbon in the Chromosphere," *Astrophysical Journal*, Vol. VI (1897), p. 412; Vol. X (1899), p. 287.

[51] *Proc. Roy. Soc.*, Vol. XXVII, p. 308.

[52] LOCKYER, "Total Eclipse of the Sun, January 22, 1898—Observations at Viziadrug," *Phil. Trans.*, Vol. CXCVII (1901), p. 203.

and calcium do in the solar chromosphere and prominences. We also find that many of the dark lines of iron and other elements are absent from fourth-type spectra, their places being covered by overlapping bright lines. Thus again, as in the case of the Sun, we have evidence that carbon in some form is associated with low-lying metallic vapors, above which rise the gases whose radiations reach us without reversal.

It is a curious fact, perhaps not without significance, that the cyanogen flutings beginning at λ4609 in fourth-type spectra do not appear to increase in strength from star to star, in harmony with the increase of intensity observed in the case of the carbon bands (see Plate VIII). This is the more remarkable when it is remembered that the cyanogen absorption in these stars is much stronger than in the case of the Sun, where these violet flutings appear to be entirely absent. For some reason the maximum intensity of these flutings seems to have been attained in so slightly developed a fourth-type star as 280 *Schjellerup*. In this connection the presence of these flutings in third-type stars, as indicated in Fig. 3, Plate VII, is of interest, particularly in view of the fact that the carbon (Swan spectrum) flutings seem to be absent from stars of the third type.

Further evidence of increased absorption, and possibly of decreased temperature, is afforded by the behavior of the metallic lines in fourth-type stars. Calcium offers an interesting case. It is well known that in the laboratory the line at λ 4227 increases in relative strength as the temperature of the calcium vapor falls, and also, according to Huggins, as the density of the calcium vapor increases. In the Bunsen burner this is a conspicuous line, while H and K are absent. The great strength of this line in the spectrum of 19 *Piscium* (Fig. 2, Plate XI) should afford a valuable criterion as to the physical condition of these stars.[53] It should be noted in this connection, as the figure indicates, that this line is equally strong in the spectra of third-type stars. The very strong and broad line at λ 6270 in the spectrum of 152 *Schjellerup* may possibly coincide with the strong line in the flame spectrum ascribed by Eder and Valenta to calcium oxide.

The tables of identifications contain more evidence of the same character. Perhaps the most interesting case of this kind is the variation of the relative intensities of the titanium lines in the group λ 4534–4536, referred to more particularly below in connection with the question of the classification of fourth-type stars.[54] The lines of this group are strongly developed in fourth-type spectra, with the exception of λ 4534.14, which is the only line of the group present in the spectra of the early *Orion* stars. This is an "enhanced" line, which in the spark spectrum is greatly reduced in intensity when the self-induction of the secondary circuit is increased. The changes in this group may be due to electrical rather than to thermal causes, but they at least harmonize with what might be expected to result from a reduction of temperature.

The possibility that spots like those on the Sun may form a characteristic feature of fourth-type stars is strongly suggested by the evidence which we have accumulated (p. 123). It is hardly necessary to say, however, that much more evidence in this direction is needed. In view of the ease with which Sun-spot spectra may be observed with instruments of moderate size, our knowledge of the widened lines is surprisingly meager. Much systematic work on spot spectra must therefore be done before the data desired for a thorough study of the question will become available. If the lines widened in Sun-spots are to be regarded as characteristic of fourth-type stars, they seem to be equally characteristic of stars of the third type. This fact will permit a rigorous test of the identification of the lines to be made, since several stars bright enough to be photographed with very high dispersion occur among the stars of the third type. It is hoped that the investigations now in progress at the Yerkes Observatory on the spectra of Sun-spots, and those which may soon be undertaken here with a cœlostat reflecting telescope and concave grating spectrograph on the spectra of a few of the brightest third-type stars, may permit a final decision to be reached regarding the presence of the

[53] It is hoped that experiments in progress at the Yerkes Observatory may permit the effects of temperature to be distinguished from those of density.

[54] See p. 134.

widened lines in the spectra of red stars. Sun-spots are presumably to be associated with a late rather than an early stage of solar development, and there is reason to suppose that they may grow more numerous as the Sun continues to cool. On *a priori* grounds, therefore, they might well be expected to be prominent features of red stars. The strong tendency of these stars to variability, which is even more pronounced in the case of fourth-type than in that of third-type stars, certainly does not lessen the probability that numerous Sun-spots are present.

The bright lines, of whose existence in fourth-type spectra we have given ample evidence, have offered difficulties of identification which we have hitherto been unable to overcome. It is a curious fact that the bright lines of the Wolf-Rayet stars, most of which have also proved impossible to identify, seem to agree in some cases with the bright lines of fourth-type spectra. From the detailed comparisons which are given elsewhere (p. 125) it will be seen that the evidence is by no means conclusive. The positions of the lines are not yet known with sufficient accuracy, and in any event the number of apparent coincidences is too small to have much meaning. In the course of this comparison, however, we could not fail to take into consideration the fact that the Wolf-Rayet and fourth-type stars possess in common a peculiarity which is shared by few other objects in the heavens, namely, the presence in their spectra of both bright and dark hydrogen lines.[55]

In a study of the spark discharge in liquids and in compressed gases[56] it has been found that as the conditions become more and more favorable to absorption—for example, as the pressure of the gas is increased—the reversals, which appear first in the ultra-violet, advance gradually into the visible spectrum. This dependence of selective absorption upon wave-length harmonizes completely with the earlier experiments of Liveing and Dewar, who obtained similar results with the electric furnace.[57]

In the Sun, although the entire series of hydrogen lines has been observed in the chromosphere, only the less refrangible members appear among the Fraunhofer lines. In this case we have a partial inversion of the phenomenon observed in Wolf-Rayet and fourth-type stars: the more refrangible members of the series are absent, while dark lines are present at the less refrangible end.

Kayser has proposed an explanation of such phenomena as a direct consequence of Kirchhoff's law. If the coefficient of absorption were identical for all spectral lines, the reversals should begin in the ultra-violet and advance toward the red. In the series lines of hydrogen, as represented in the Sun, the coefficient of absorption decreases so rapidly with the wave-length that the strong lines in the visible spectrum reverse first. The reversals should be strongest near the wave-length of maximum energy for the absorbing body.[58] As compared with the Sun, the Wolf-Rayet stars should therefore show a shift of the maximum of intensity in the hydrogen spectrum toward the violet.

It is fortunately possible to test this assumption, as Campbell has shown that the Wolf-Rayet star *DM.* + 30°3639 has an extensive hydrogen atmosphere, the bright lines of which can be observed directly. Campbell, indeed, found that in this case $H\alpha$ is very faint, while $H\gamma$ is brighter and $H\beta$ is very bright indeed.

Langenbach has recently shown that the maximum of intensity in a line spectrum shifts toward the violet with increasing temperature, just as it does in the case of a continuous spectrum from a solid body. Thus with hydrogen an increase of current strength through the primary of the induction coil increased the intensity of the $H\alpha$, $H\beta$, and $H\gamma$ lines, but the increase was most rapid for the more refrangible of these lines. Similar results were found for lithium and helium.[59]

Langenbach concludes that his experiments indicate a very high temperature for the nebulæ, where a similar shift of the maximum has been observed. Such a conclusion might perhaps apply to the Wolf-Rayet stars, but it would be out of harmony with what we know regarding stars of

[55] The bearing of this fact on the classification of stellar spectra is discussed on p. 134.

[56] GEORGE E. HALE, "Note on the Spark Spectrum of Iron in Liquids and in Air at High Pressures," *Astrophysical Journal*, Vol. XV (1902), p. 132; GEORGE E. HALE, "Selective Absorption as a Function of Wave-Length," *ibid.*, p. 227; GEORGE E. HALE AND N. A. KENT, "Second Note on the Spark Spectrum of Iron in Liquids and Compressed Gases," *ibid.*, Vol. XVII (1903), p. 154.

[57] *Proc. Cambridge Phil. Soc.*, Vol. IV (1882), p. 256.

[58] *Astrophysical Journal*, Vol. XIV (1901), p. 313.

[59] *Annalen der Physik* (4), Vol. X, p. 789.

the fourth type. Pickering states that in a photograph of the spectrum of a meteor $H\delta$ is the most intense of the hydrogen lines.[60] But would it be safe to conclude that the hydrogen in the meteor was hotter than the hydrogen in the Sun? In such a star as γ *Cassiopeiae*, where the temperature may be considerably higher than in the Sun, $H\beta$ is more intense than any of the other lines. But in certain variable stars of long period, which are generally supposed to be cooler than the Sun, $H\gamma$ is the strongest hydrogen line.[60]

In the case of the nebulæ, meteor, and third-type variables, Thomson's observation of the spectrum of hydrogen in a vacuum tube, separated into two parts by an aluminium partition, may perhaps be significant. He found that $H\alpha$ was brighter than $H\beta$ at the positive pole, while at the negative pole the relative intensities of the two lines were reversed.[61] Although Kirchhoff's law could not be supposed to hold for a gas radiating in this way, a shift of the maximum thus produced might perhaps cause the effects observed in the case of the fourth-type stars. We believe that since much evidence favors the view that the fourth-type stars are cooler instead of hotter than the Sun, a further study of the whole subject must be made.[62]

CLASSIFICATION AND EVOLUTION OF FOURTH-TYPE STARS

Although we have investigated in detail the spectra of but eight stars, our collection of photographs comprises the spectra of the following stars of the fourth type: 7 *Schjellerup*, *DM.*+57° 702, 27*a* *Schj.*, 41 *Schj.*, 51 *Schj.*, 72 *Schj.*, 74 *Schj.*, 78 *Schj.*, 115 *Schj.*, 318 *Birmingham*, 132 *Schj.*, 152 *Schj.*, 155*b* *Schj.*, 458 *Birm.*, 219 *Schj.*, 229 *Schj.*, 509 *Birm.*, 521 *Birm.*, 541 *Birm.*, 238 *Schj.*, 249*a* *Schj.*, 251 *Schj.*, 280 *Schj.*, 19 *Piscium*. All of these spectra have been used in a study of the classification and evolution of fourth-type stars. This inquiry divides naturally into two parts: (1) the development of these stars, as shown by changes in their spectra; (2) their relationship to other stars and their place in a general scheme of classification.

The criteria which we employed in arranging the stars in a series were the changes of the intensity of the carbon bands and of various groups of lines. The several series obtained independently by means of the different criteria in general agreed very well, though the peculiarities of certain lines sometimes changed the order somewhat in a few cases. The average series, based upon all the criteria, is illustrated in Plates VIII and IX. From these plates it will be seen that the spectra naturally fall into three divisions: (1), represented in the plates by the spectrum of 280 *Schj.*, includes also 541 *Birm.*; (2), represented in the plates by 19 *Pisc.*, 318 *Birm.*, 74 *Schj.*, 78 *Schj.*, 132 *Schj.*, and 115 *Schj.*, includes also 7 *Schj.*, 229 *Schj.*, 249*a* *Schj.*, 51 *Schj.*, 219 *Schj.*, 251 *Schj.*, 238 *Schj.*, 72 *Schj.*, and 458 *Birm.*; (3), represented in the plates by 152 *Schj.* and 155*b* *Schj.*, includes also 41 *Schj.*, 521 *Birm.*, 509 *Birm.*, 27*a* *Schj.*, and *DM.*+57° 702. It will be seen that the second division contains a large proportion of the stars. Within this division the order of arrangement is somewhat uncertain, as the differences among the spectra are so inconspicuous that they are frequently offset by such effects as may arise from differences of slit-width, exposure time, development, etc. The approximate order in this division is indicated by the foregoing enumeration of the stars which comprise it. Many of these are so nearly alike that their relative places in the series cannot be certainly determined from available data.[63]

[60] *Harvard College Observatory Circular*, No. 20.

[61] *Proc. Roy. Soc.*, Vol. LVIII (1895), p. 255.

[62] We are informed by Professor Schuster that he has worked out a new explanation of the simultaneous presence of bright and dark lines in stellar spectra, which will soon be published. It is hoped that the solar work now in progress at the Yerkes Observatory may also throw some light on this question. We reserve a detailed discussion until certain experiments are completed.

[63] To indicate the character of some of the changes which occur in passing through the series of stars, the following lines are noted as peculiar to 152 *Schj.* and other stars in the third division:

1. *Blue region.*— The strong dark line λ 4751.6, which shades off toward the violet and appears like a fluting, is found only in 152 *Schj.* No high dispersion photographs were made for other stars of the third division.

2. *Yellow-green region:*

Bright line at λ 5236.2, intensity 10; this line has intensity 6 in 115 *Schj.*, and is present, though less conspicuous, in the other stars.

Bright line at λ 5506.3, intensity 5-6; this line has intensity 2-3 in 74, 78, and 132 *Schj.*

Bright line at λ 5591.4, intensity 10. The most conspicuous bright line in the spectrum. It is near the brightest part of a carbon fluting; the other stars show a group of bright lines here whose combined intensity is very much less than that of the line in 152 *Schj.*

According to Dunér, the relative intensities of the carbon bands are not the same in all of these stars: in 19 *Piscium* the yellow band is much fainter than the other principal bands, while in 152 *Schjellerup* it is as strong as the blue band and nearly as strong as the green band. As our spectra were photographed in sections, we are not in a position to discuss this question, and we shall not undertake to do so. We can only say that our plates show nothing capricious about the behavior of the bands, as the stars occupy practically the same order in the series whether they be arranged with reference to the intensity of the blue or that of the yellow band. It therefore might appear that the absorption of carbon, as represented by either the blue or the yellow bands, increases gradually with the star's development. As Dunér's method of observation was better adapted than our own to show differences in the relative intensities of the bands, we would nevertheless attach greater weight to his opinion on this subject.

It will be noticed that the order of development in our series corresponds exactly with that given by Dunér in his memoir. In fact, so far as our results are comparable with those of Dunér, they generally tend to confirm them in all respects.

With few exceptions, spectroscopists have agreed that on account of the close resemblance between the two great classes of red stars, their spectra should be classed together. This was the view of Vogel when he prepared his system of classification and provided in the two subdivisions of his third class for the stars of Secchi's third and fourth types. Dunér, to whose valuable memoir we have had so many occasions to refer, considered that his observations went to confirm Vogel's classification, which he adopted without modification. Pechüle, on the contrary, held that the stars of Secchi's third and fourth types could not be considered as co-ordinate branches starting from the Sun, since no star was known to occupy a position intermediate between that of a fully developed fourth-type star and the Sun. As Pechüle's memoir is not accessible to us, we quote the following extract as given by Lockyer in *The Meteoritic Hypothesis* (p. 346):

M. Vogel a proposé une classification suivant les diverses phases de refroidissement indiquées par les spectres, dans laquelle il fait des types III et IV de Secchi deux subdivisions d'une même classe, IIIa et IIIb. Mais je trouve certaines difficultés négatives contre cette classification relativement au rôle qu'y joue le IIIb. En effet, il est admis que le IV type de Secchi se distingue nettement du III type, non seulement par la position et la quantité des zones obscures, mais aussi par le fait très-remarquable, que les principales de ces zones sont bien définies et brusquement interrompues du côté du violet dans le III type, du côté du rouge dans le IV. Or, si le IV type doit représenter une des phases de refroidissement, par lesquelles passent les étoiles, on peut faire deux hypothèses. La première est que le spectre du IV type soit co-ordonné au spectre du III type, de manière qu'il y ait des étoiles, qui passent de la phase représentée par le II type, à la phase représentée par le III type, et d'autres, qui passent directement du II type au IV. Mais cette hypothèse est inadmissible. Car on connaît des spectres intermédiaires entre le I et le II type, et entre le II et III; mais on ne connaît pas, à ce que je sache, des spectres du II type tendant au IV. Reste donc l'hypothèse, que la phase de refroidissement, représentée par le spectre du IV type, soit postérieure à la phase représentée par le III type, de manière que les spectres des étoiles passent du III au IV type. Si ce passage se fait peu à peu, il devrait y avoir des spectres intermédiaires entre le III et le IV type; mais quoique Secchi par example le 17 janvier 1868, ait déterminé le spectre de l'étoile 273 Schjell., comme semblant intermédiaire entre le III et le IV type, il l'a plus tard reconnu du IV type, et l'existence des spectres de III–IV type n'est nullement prouvée. On pourrait objecter que les étoiles du IV type sont peu nombreuses et en général si petites que leurs spectres sont difficiles à voir, et que par conséquent il pourrait y avoir parmi ces spectres quelquesuns, qui se rapprochassent du III type. Mais je réponds à cette remarque, que les spectres du III–IV type, indiquant une phase moins refroidie, devraient au contraire en général appartenir à des étoiles plus grandes que celles ayant des spectres du IV type. Si on veut supposer que le passage du III au IV type se fasse subitement, ou par une catastrophe, pendant laquelle apparaissent des lignes brillantes, cette supposition même constituerait une différence physique bien plus distincte entre le III et le IV type qu'entre le II et le III; et le IV type représenterait une phase bien distincte, la dernière peut-être avant l'extinction totale Le rôle physique du IV type est donc encore si mystérieux, que j'ai cru pouvoir encore me conformer à l exemple de d'Arrest, en suivant la classification formelle de Secchi.

Pechüle's objections were well answered by Dunér, who showed that in view of the comparatively small number of stars known to have spectra of Secchi's fourth type, it is not at all surprising that objects representing the transition from the solar stage have not been observed. As Dunér very justly remarks, it would be difficult to recognize stars in this transition stage without a much more thorough spectroscopic survey than has yet been made. Although 280 *Schjellerup*, which represents the earliest state of a fourth-type star that we have observed, contains many features characteristic of the fourth type, these might easily be overlooked in photographs taken with very low dispersion. As the spectra reproduced in Plates VIII and IX show, the carbon absorption bands in this star are relatively very feeble. In the yellow, the band is reduced to a single pair of heavy lines. Stars earlier in point of development would of course show even less marked evidence of carbon absorption, and would probably be classed as solar stars. 541 *Birmingham* (*DM.* + 38°3957), the star considered by Dunér to represent better than any other the transition stage, is shown by our photographs to have a spectrum practically identical with that of 280 *Schjellerup* (though we have no evidence as to the presence of the bright $H\beta$ line). It may confidently be expected that when spectra of the solar type are better known, objects intermediate in development between 280 *Schjellerup* and the Sun will be discovered. This argument of Dunér's, which we can only confirm, disposes of Pechüle's principal objection to Vogel's classification. We shall have occasion farther on to refer more particularly to the close resemblance between the line spectra of the third and fourth types, as well as to other details which lead us to adopt the views of Vogel and Dunér.

According to the classification of stellar spectra developed by Lockyer in conjunction with his meteoritic hypothesis, stars of Secchi's third and fourth types are far removed from each other in point of development. The third type represents a swarm of meteorites in the first stage of transition from the nebulous to the stellar condition, while the fourth type represents the last stage in stellar life, immediately following the condition of the Sun.

So far as the fourth-type stars are concerned, it therefore appears that Lockyer adopts the view held by other investigators, and confirmed by the present research, namely, that they represent the last stage of stellar development. But we do not think that he has given sufficient reasons for separating fourth-type stars from those of the third type. In the first place, we are unable to understand how the spectra of third-type stars can be considered to resemble in any way the spectra of nebulæ, or to be evolved from nebular spectra. So far as we are aware, no star showing a spectrum intermediate in character between that of a nebula and the spectrum of a third-type star has hitherto been detected. This seems to us a most serious objection to Lockyer's classification.

Furthermore, the results of the present investigation offer reasons for believing that the two great classes of red stars are closely related to each other, and that they are to be regarded as co-ordinate branches, each of which can be traced back to the Sun. The dark lines of the two types agree remarkably well (Plates X and XI). There is every reason to believe that if the bands were absent from the two types of spectra the line spectra would resemble each other very closely indeed—much more closely than either would resemble the spectrum of the Sun (Fig. 2, Plate XI). The chief distinction between the two types is thus confined to the bands and flutings, and even here we have a close resemblance in the case of cyanogen. The great strength of the λ 4227 calcium line, and the probable presence as conspicuous features in both types of the lines greatly widened in Sun-spots, certainly tend to emphasize the relationship of the two classes of red stars. It would seem very important to secure further evidence regarding the question of widened lines, especially with reference to their exact identification in third-type spectra. If Sun-spots exist on these stars, they can hardly be regarded as slightly condensed meteor swarms, as required by the meteoritic hypothesis.

We may sum up the points of resemblance of third- and fourth-type stars as follows:

The stars resemble each other: (1) in their red color; (2) their remarkable tendency to variability; (3) the very close resemblance of the dark lines in their spectra; (4) the possibility that

the spectra of both may contain the lines which are widened in Sun-spots; (5) the similar physical conditions indicated by the character of their spectra; (6) the presence of bright lines in their spectra; (7) the presence in their spectra of dark flutings, of which the cyanogen flutings are common to both types; (8) the connection between both types of spectra and the spectra of solar stars.

Some of these points of resemblance are suggested rather than demonstrated by the results of the present research, and much work must be done in the future on the spectra of both these classes of stars. But we believe that the existing evidence is decidedly favorable to the views of Vogel and Dunér, and that stars of Secchi's third and fourth types should therefore be classed as co-ordinate branches, having their origin in solar stars.

Apart from the evidence afforded by the similarity of stars of the third and fourth types, certain other considerations bearing on the general question of classification should be presented here. It has already been shown that the Wolf-Rayet and fourth-type stars have three points in common: (1) their tendency to cluster in the Milky Way; (2) the presence in their spectra of bright lines, a few of which may be common to both types; (3) the presence in their spectra of both bright and dark hydrogen lines. If any organic relationship between these two classes of stars could be established, it would conflict seriously with current ideas regarding stellar evolution. The Wolf-Rayet stars, for many excellent reasons, are generally believed to be related to the *Orion* stars, and to precede stars like *Sirius* in point of development. We consider that the results of the present investigation do not oppose this view, but rather tend to strengthen it. In the first place, we are not prepared to say that the tendency of certain classes of stars to cluster in or near the Milky Way necessarily indicates any organic relationship between such objects. If it were assumed, for example, that the fourth-type stars are at immense distances from the Earth,[64] and that an absorbing medium, most dense near the poles of the Milky Way, exists in space, an apparent clustering of these stars toward the Milky Way would result. It would be impossible, of course, to account in this way for the fact that *all* of the Wolf-Rayet stars occur in the Milky Way (or in the Magellanic Clouds), but it does seem to follow that such a distribution of the fourth-type stars as we actually observe need not indicate any relationship with Wolf-Rayet stars.[65] Bright lines have been found in so many different types of spectra that they cannot be regarded as a safe basis for classification, and they are not employed for this purpose. Finally, as we have already remarked (p. 131), the variations in the relative intensities of the hydrogen lines in nebulæ, Wolf-Rayet stars, third-type variables, and meteors are such as to permit no final conclusion to be drawn at present as to the physical condition implied by these phenomena. We therefore see no reason to believe that any important relationship connects the Wolf-Rayet and the fourth-type stars, though the bright lines and the physical condition of hydrogen in both should be made the subjects of further investigation.

The variations of the relative intensities of certain lines of titanium have an interesting bearing on the general classification of stellar spectra. The line λ 4534.14, ascribed by Rowland to *Ti-Co*, is first seen in β and γ *Orionis* as an extremely faint and diffuse darkening on the continuous spectrum. The line grows steadily stronger in the following stars: ζ *Tauri*, γ *Corvi* (Vogel's I*b*), ϵ *Ursae Majoris*, α *Cygni*, α *Canis Majoris* (Vogel's I*a*2)—and reaches maximum intensity in α *Persei*, where it is narrow and sharp, and in ϵ *Aurigae*, where it is broad. The line then decreases in intensity through the solar stars γ *Piscium* and α *Boötis*, and in the third-type stars α *Orionis* and α *Tauri*, where it is the faintest line of the titanium group. In the fourth-type stars this line is the only one of the titanium group which is absent. In the spark spectrum of titanium, the line varies greatly

[64] Professor Boss, who has very kindly looked up for us in his records the proper motions of a large number of fourth-type stars, finds that for seventeen stars the average proper motion is only about 0."01, while in other cases, which are not so well determined, the proper motion is apparently in no instance greater than 0."10, and for more than half the stars it is less than 0."05.

[65] The assumption that stars may differ in chemical composition, and that this may be related in some way to their distribution in space, must not be left out of account in an exhaustive discussion of stellar classification; but it need not be considered here.

with change of self-induction in the secondary circuit, becoming fainter with increasing self-induction. It is stronger in the spark than in the arc.

The three lines of the group λ 4538.8 – 4536.3, on the other hand, are absent or very faint in all of the stars preceding γ *Piscium* in the above list. They then appear as strong lines, and they are strongly represented in solar, third-type, and fourth-type stars. The changes of these lines are illustrated in Fig. 3, Plate XI. All of the photographs, except that of the fourth-type star 132 *Schjellerup*, were made with the Bruce spectrograph by Messrs. Frost and Adams, to whom we are indebted for some of the information given here.

SUMMARY OF RESULTS AND CONCLUSIONS

1. The spectra of stars of Secchi's fourth type contain a large number of bright and dark lines, in addition to the violet flutings of cyanogen and the flutings of the Swan spectrum.

2. The approximate radial velocities of eight stars range from + 5 km. to – 28 km.

3. Measures of the wave-lengths of 307 dark lines (average probable error of the mean, 0.07 t.m.) indicate that the following substances are represented: carbon (as cyanogen and in the elementary or combined state corresponding to the Swan spectrum), hydrogen, vanadium, calcium, magnesium, sodium, iron, chromium, titanium, nickel, manganese, and possibly two or three other substances.

4. The carbon and metallic vapors are very dense, and lie immediately above the photosphere.

5. Above these dense vapors of the reversing layer rise other vapors or gases, represented in the spectra by bright lines. The conditions are thus similar to those that exist on the Sun.

6. The bright lines, of which about 200 are present, seem to represent unknown gases, since none of them could be identified with certainty. A few of these lines may perhaps correspond with bright lines in the spectra of Wolf-Rayet stars.

7. The great strength of such lines as λ 4227 of calcium, and the fact that arc and flame lines are strong, while spark lines are less prominent or missing, suggests, though it does not prove, that the temperature of the reversing layer may be lower than in the case of the Sun.

8. The fact that many lines widened in Sun-spots are represented by strong dark lines suggests that spots similar to those on the Sun may be numerous on fourth-type stars.

9. In the spectrum of 19 *Piscium* $H\gamma$ and $H\delta$ are present as dark lines, while $H\beta$ is absent. In the spectrum of 280 *Schjellerup* and in some of the other stars $H\beta$ appears as a bright line. Fourth-type spectra thus resemble spectra of the Wolf-Rayet type in showing the more refrangible hydrogen lines dark and the less refrangible ones bright or absent.

10. The bright $H\beta$ line in the spectrum of 280 *Schjellerup* undergoes variations of intensity.

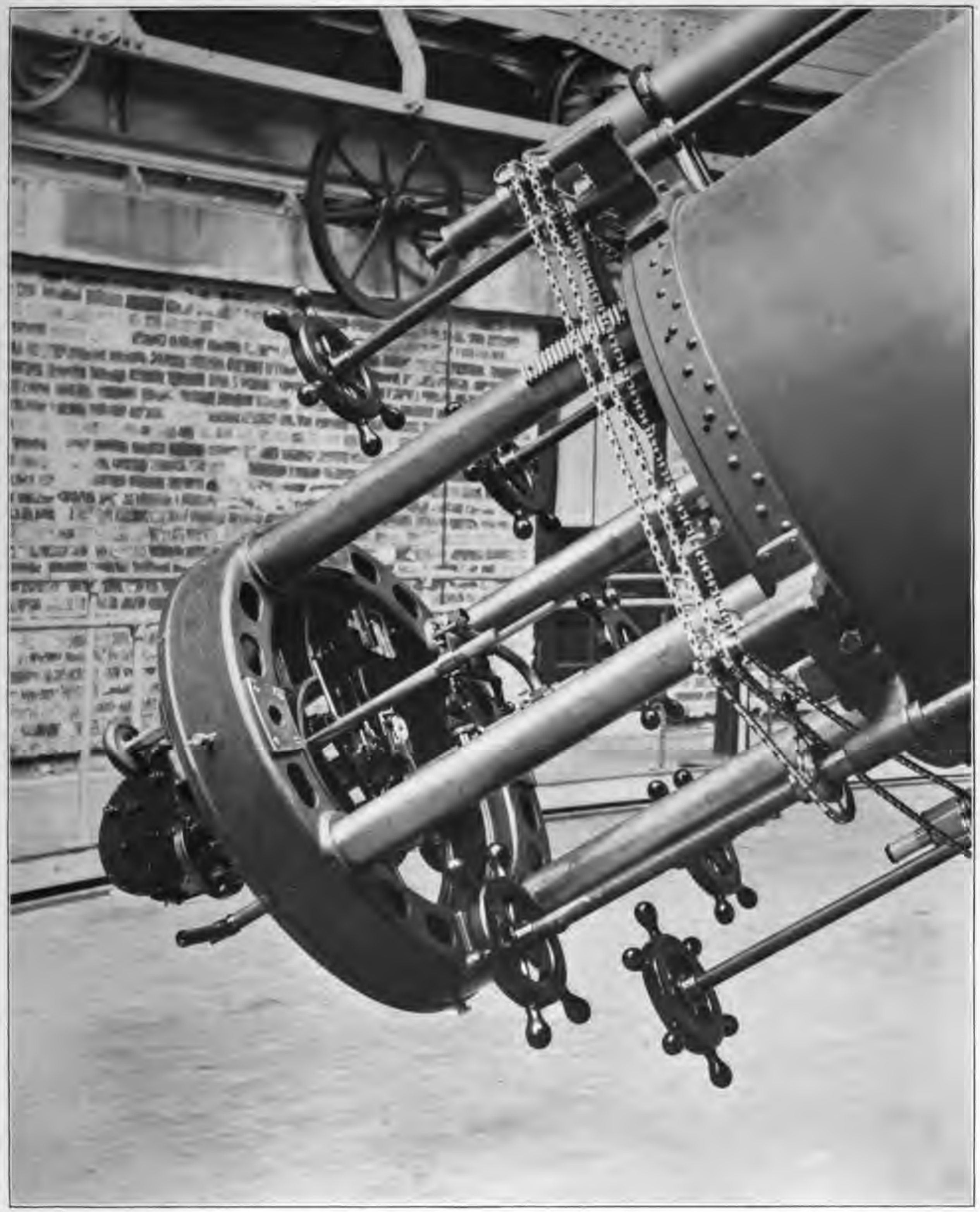
11. About 20 per cent. of the fourth-type stars are variable. The tendency to variability, therefore, seems to be even greater than in the case of stars of Secchi's third type.

12. The condensation of fourth-type stars in and near the Milky Way is very marked.

13. Stars of the third and fourth types resemble each other in color, tendency to variability, spectra, possible presence of Sun-spots, physical condition, and probable relationship to solar stars. They should therefore be classed together, as co-ordinate branches leading back to stars like the Sun.

14. Variations in the relative intensities of certain titanium lines indicate that fourth-type stars are probably very widely separated from Wolf-Rayet stars in point of development.

15. Fourth-type stars probably develop from stars like the Sun through loss of heat by radiation.



THREE-PRISM SPECTROGRAPH ATTACHED TO FORTY-INCH REFRACTOR

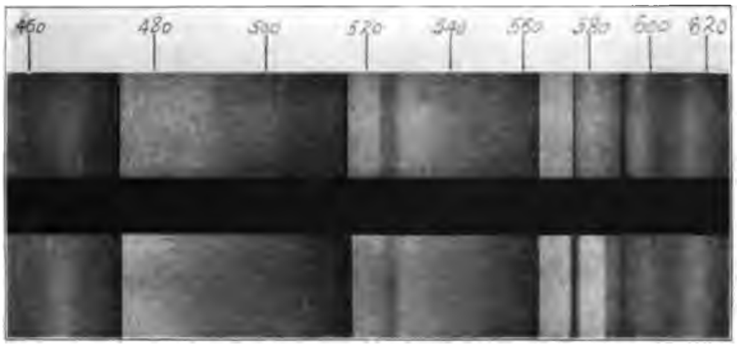


FIG. 1. SPECTRA OF FOURTH-TYPE STARS (VOGEL)

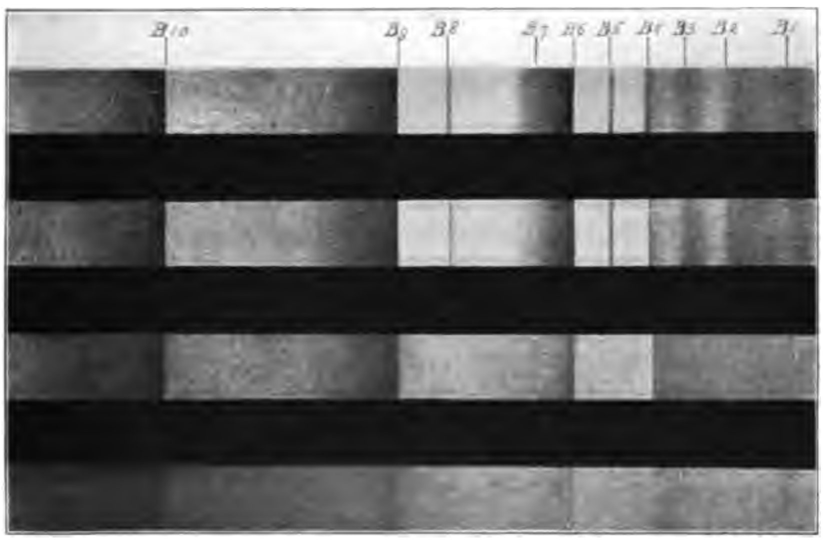


FIG. 2. SPECTRA OF FOURTH-TYPE STARS (DUNÉR)

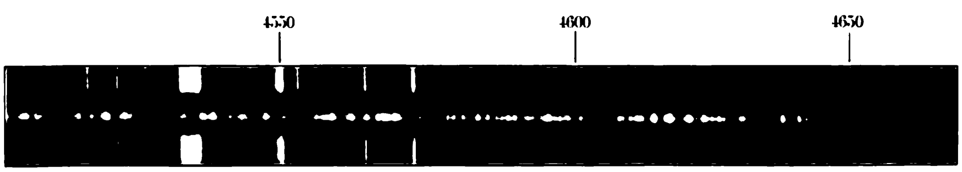


FIG. 3. BRIGHT LINES IN THE SPECTRUM OF 132 *SCHJELLERUP*

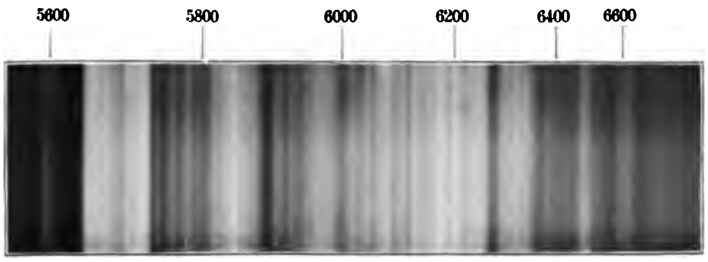


FIG. 1. RED END OF THE SPECTRUM OF 152 *SCHJELLERUP*

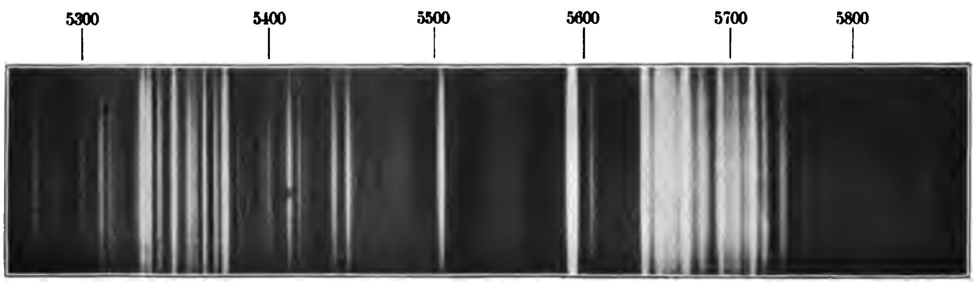


FIG. 2. BRIGHT LINES IN THE SPECTRUM OF 152 *SCHJELLERUP*

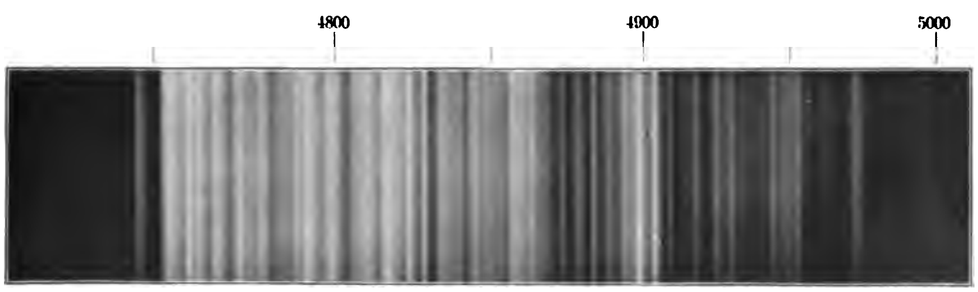


FIG. 3. BRIGHT LINES IN THE SPECTRUM OF 152 *SCHJELLERUP*

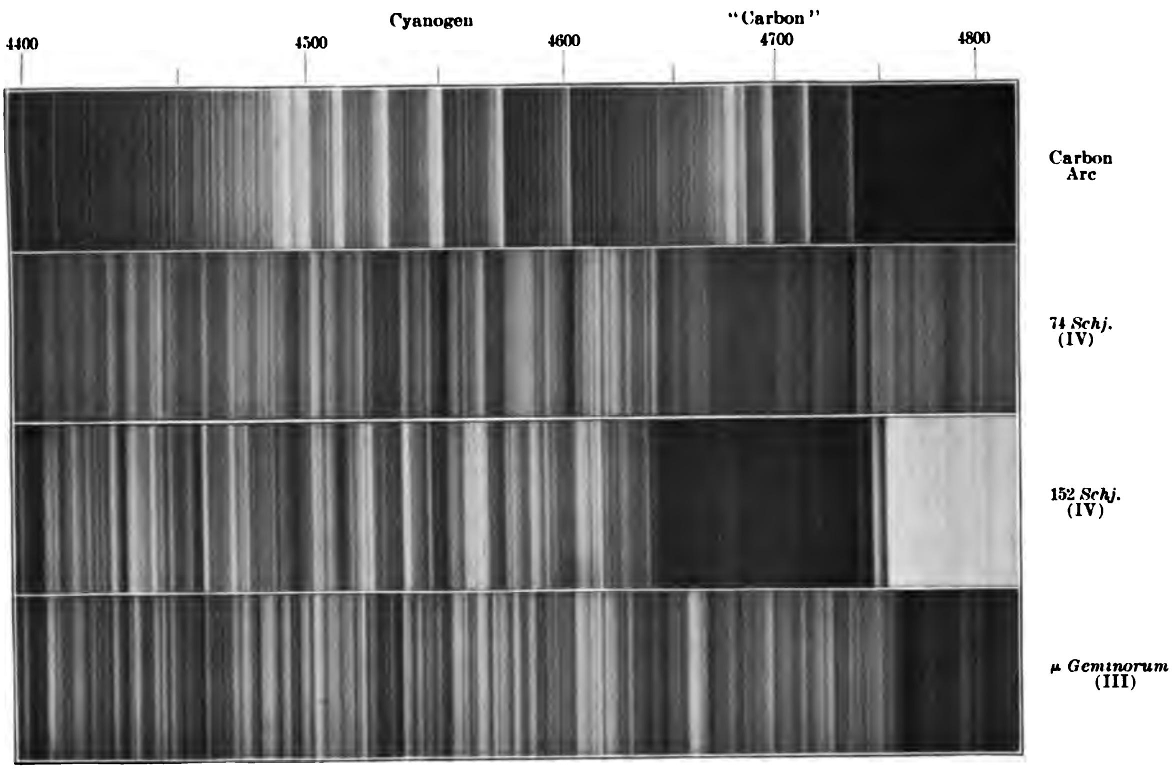


FIG. 1. BLUE CYANOGEN AND "CARBON" FLUTINGS

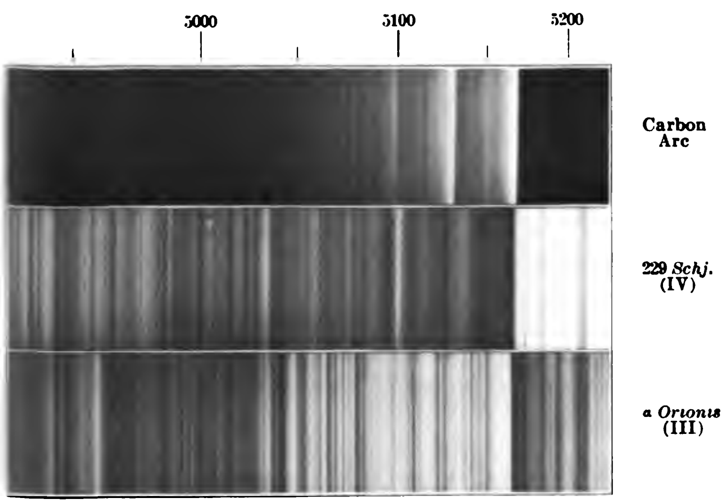


FIG. 2. GREEN "CARBON" FLUTING

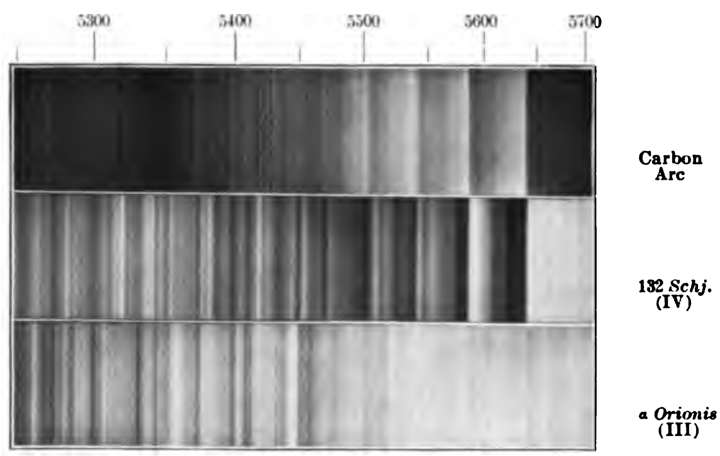
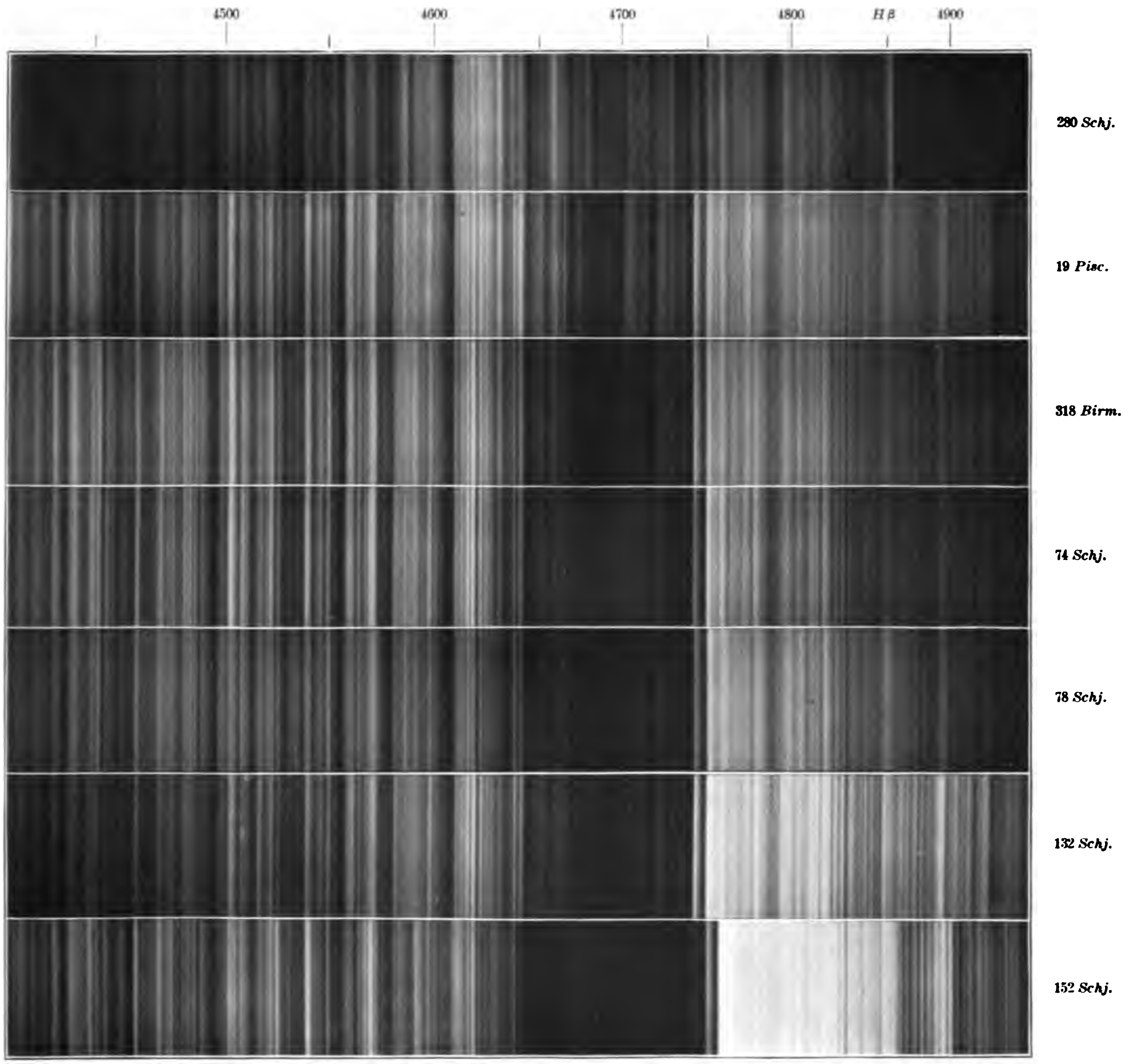
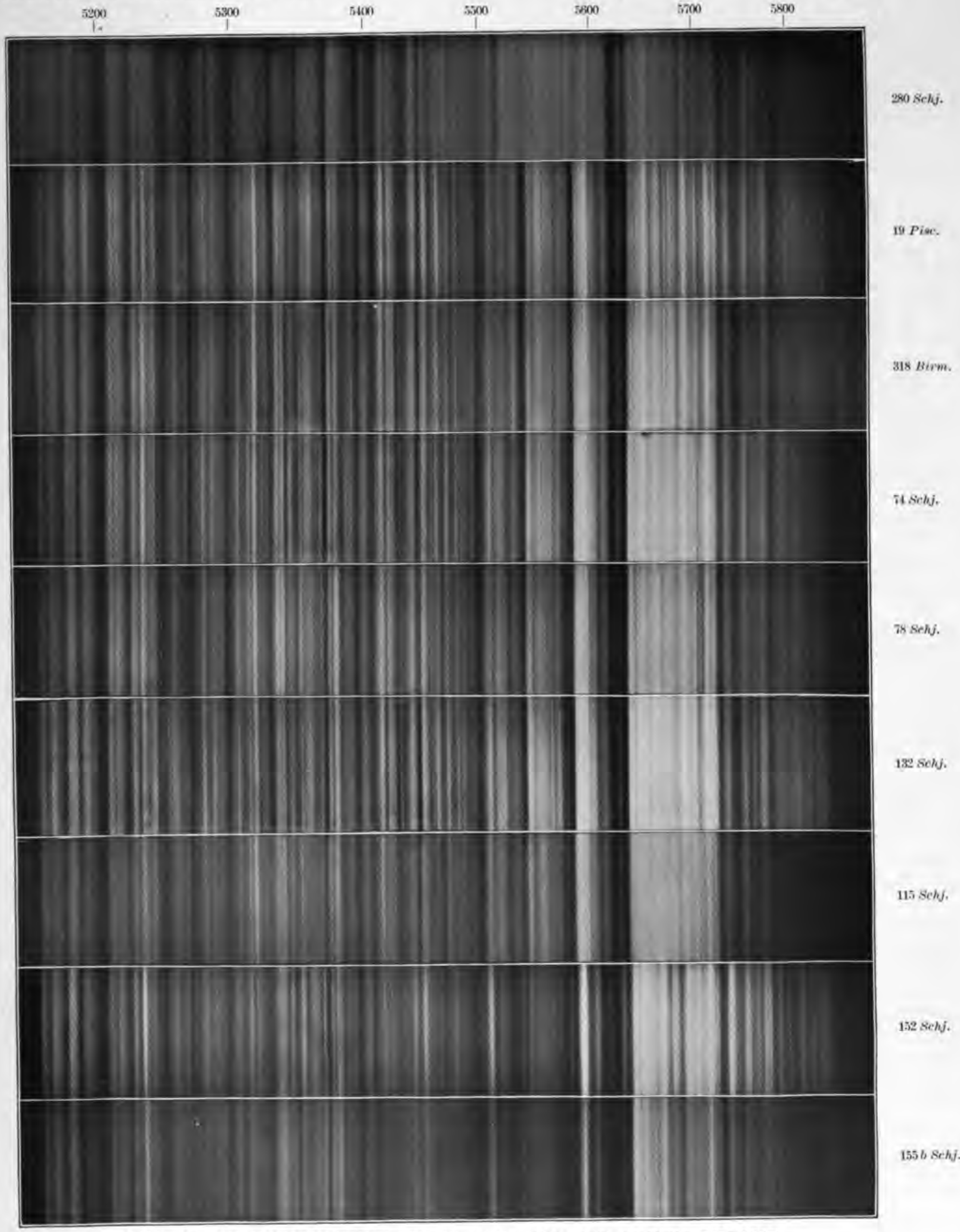


FIG. 3. YELLOW "CARBON" FLUTING

SPECTRUM OF CARBON ARC COMPARED WITH SPECTRA OF THIRD AND FOURTH TYPES



SPECTRA OF FOURTH-TYPE STARS (BLUE REGION)



SPECTRA OF FOURTH-TYPE STARS (YELLOW AND GREEN REGION)

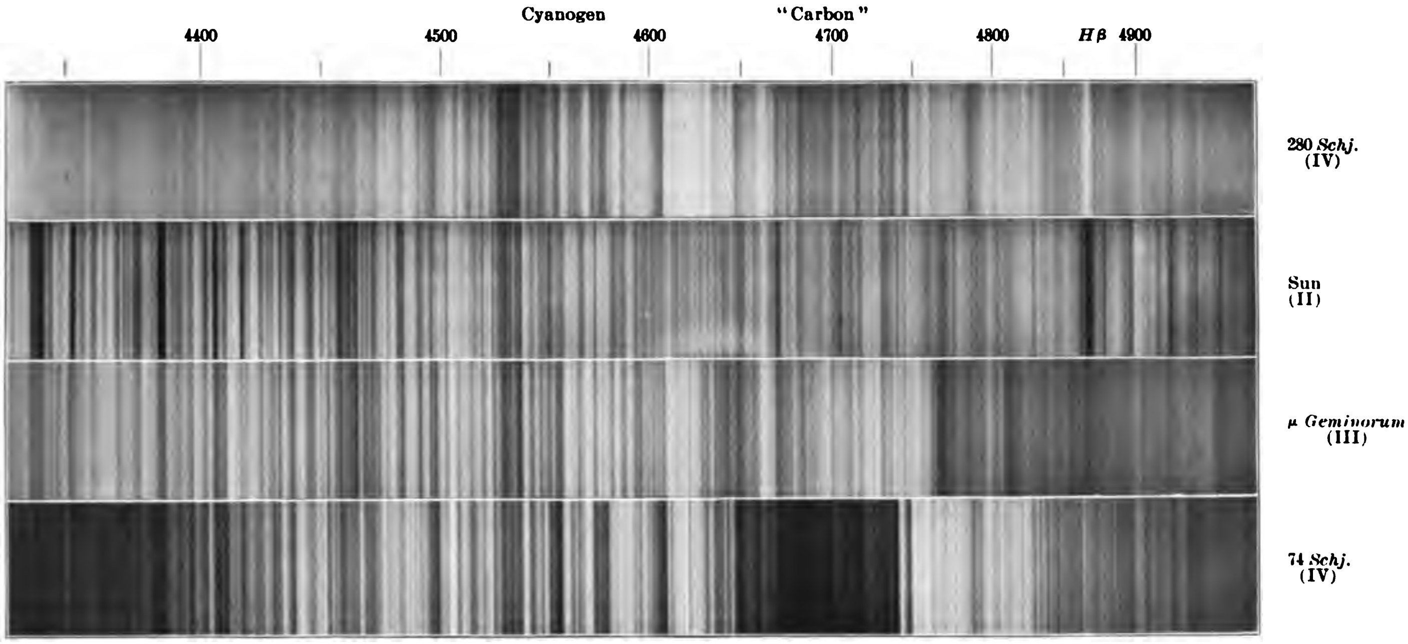


FIG. 1. BLUE REGION

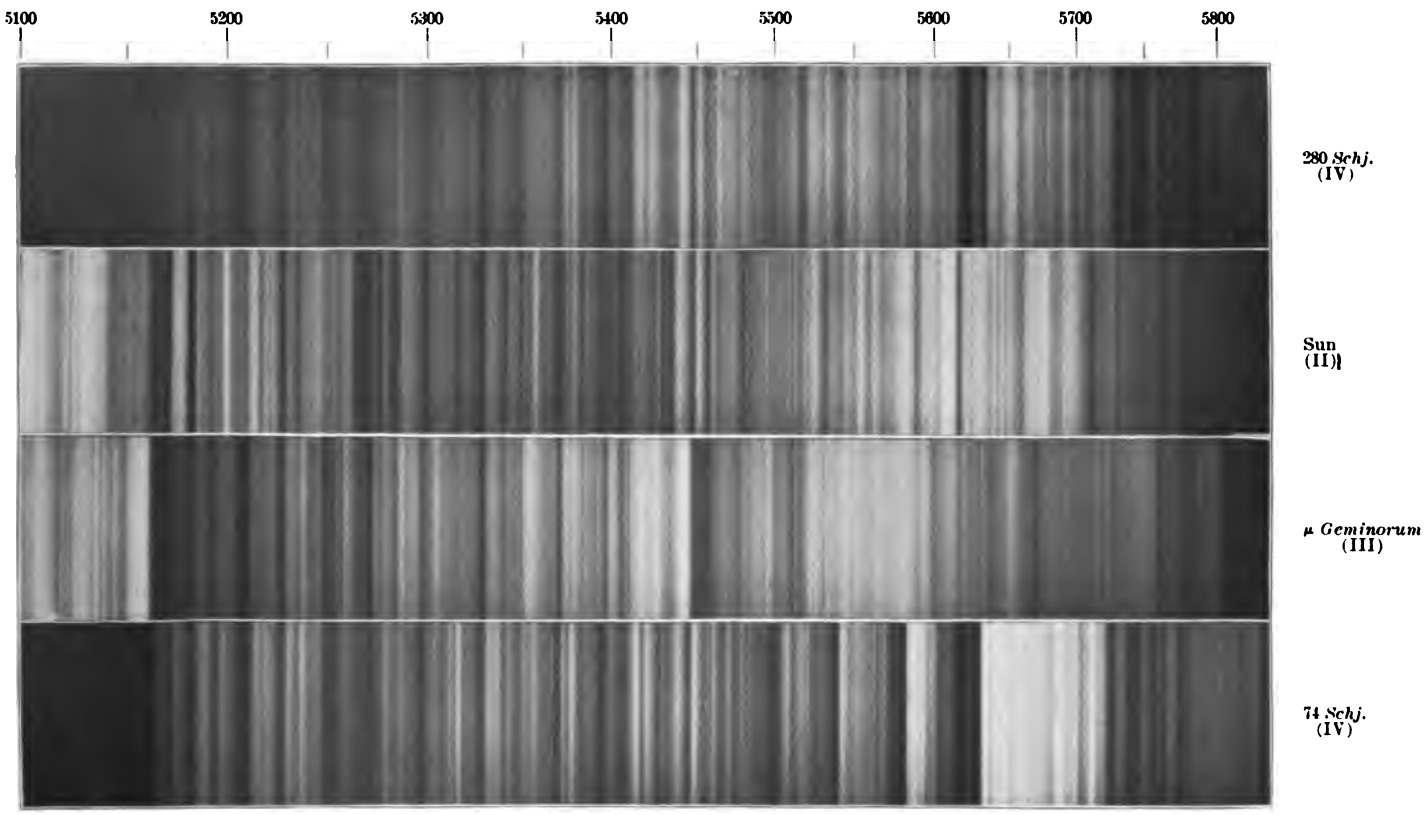


FIG. 2. GREEN AND YELLOW REGION

COMPARISON OF SPECTRA OF SECOND, THIRD, AND FOURTH TYPES

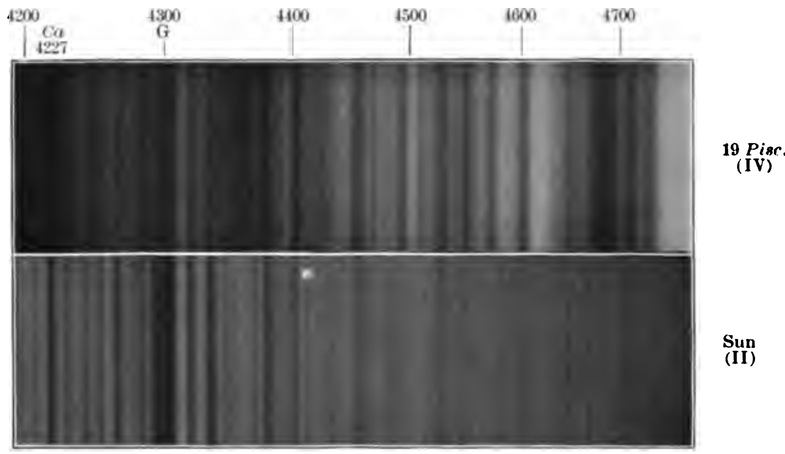


FIG. 1. SPECTRA OF SECOND AND FOURTH TYPES (BLUE REGION)

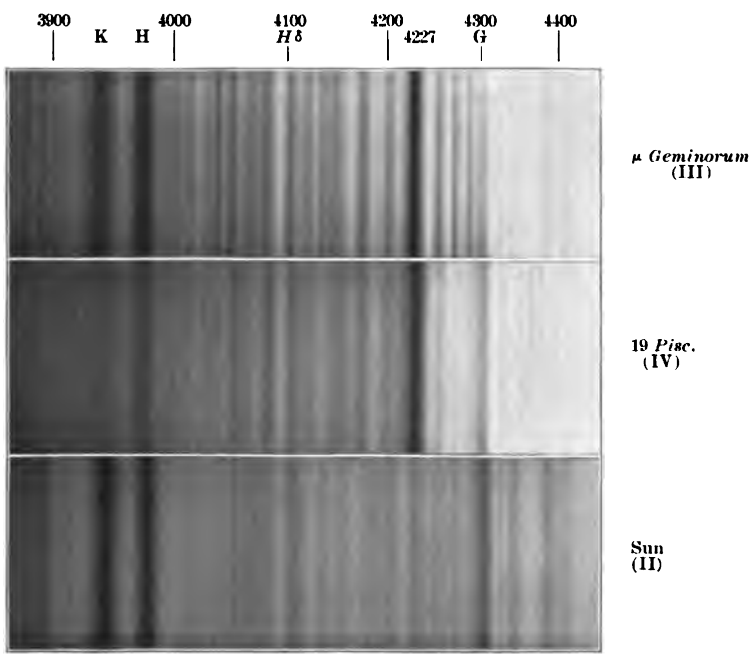


FIG. 2. SPECTRA OF SECOND, THIRD, AND FOURTH TYPES (VIOLET REGION)

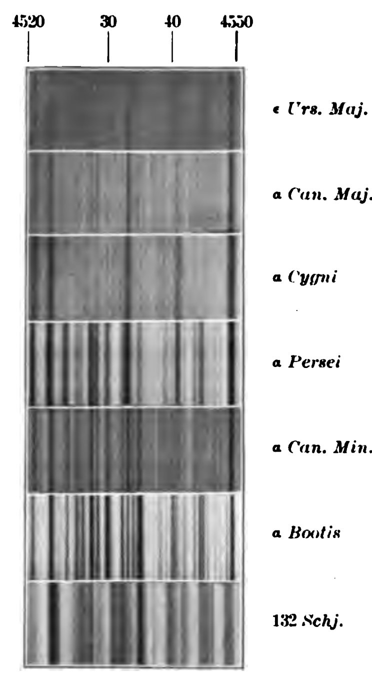


FIG. 3. TITANIUM LINES IN STELLAR SPECTRA